GA21-9370-4

# IBM 5294 Control Unit

## Operator's Guide and Operating Procedures

IBM

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File Number
S5250/S36/S38-06

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## Fifth Edition (November 1987)

This revision makes obsolete GA21-9370-3. Information about the IBM 3197 Model C Color Display Station was added. Miscellaneous technical changes and additions were also made.

Changes are periodically made to the information herein; these changes will be reported in technical newsletters or in new editions of this publication.


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# Contents

# About This Manual

## Purpose of this manual . . .

This manual is for operators of the 5294 Control Unit; it assumes that the operator is familiar with the operation of at least one of the following display stations:

- IBM 5251 Display Station
- IBM 5291 Display Station
- IBM 5292 Color Display Station
- IBM 3179 Model 2 Color Display Station
- IBM 3180 Model 2 Display Station
- IBM 3196 Display Station
- IBM 5555 Display Station
- IBM 3197 Display Station.

This manual describes the meaning of the indicators and the use of the switches on the 5294 Control Panel. This manual also describes how to:

- Operate the 5294 Control Unit from a display station.
- Use a display station to sign onto the host system.
- Resolve problems when unexpected results occur.

## Organization of this manual . . .

This manual is divided into four chapters and two appendixes.

Chapter 1 explains the meaning of the indicators and the use of the switches.

Chapter 2 contains information about starting communications with a host system.

The first part of Chapter 2 contains flow diagrams of the procedures used to establish a connection from the 5294 Control Unit to a host system. The second part of Chapter 2 contains step-by-step procedures used to establish a connection from the 5294 Control Unit to a host system.

Chapter 3 contains a step-by-step problem analysis to assist you when unexpected results occur.

Chapter 4 contains information about the verification tests. A step-by-step procedure tells you how to display the verification test prime option menu.

Appendix A is the extended test routine. This test is run during problem analysis.

This guide also contains a glossary.

## If you need more information . . .

You may wish to refer to one of the following publications:

*IBM 5292 Color Display Stations Setup Procedure*, GA21-9415, provides step-by-step instructions for the setup and checkout of the 5292 Color Display Station. This manual is used after the display station has been unpacked and placed in position.

*IBM 5250 Information Display System Introduction*, GA21-9246, describes the work stations that make up the 5250 and their available functions and features.

*IBM 5291 Display Station Setup Procedures*, GA21-9408, provides step-by-step instructions for the setup and checkout of the IBM 5291 Model 1 Display Station. This manual is used after the display station has been unpacked and placed in position.

*IBM 5291 Model 2 Display Station Setup Procedures*, GA21-9802, provides step-by-step instructions for the setup and checkout of the 5291 Model 2 Display Station. This manual is used after the display station has been unpacked and placed in position.

*IBM 5250 Information Display System Planning and Site Preparation Guide*, GA21-9337, provides environmental, electrical, communications, space, furniture, and cable specifications to assist in planning for the installation of the IBM 5250 Information Display System. This manual also provides information to help the system programmer configure the system and prepare instructions for setup personnel at remote sites.

*IBM 5250 Information Display System Functions Reference Manual*, SA21-9247, describes the programming requirements for communicating with the 5250 Information Display System. This manual also contains information to help a system planner design a configuration using the 5250 system and to determine problem-causing areas within the remote link to that system.

*IBM 5256 Printer Operator's Guide*, GA21-9260, describes how to operate the 5256 Printer and how to correct conditions when the printer does not operate as expected.

*IBM 5294 Control Unit Setup Procedure*, GA21-9369, provides step-by-step instructions for the setup and checkout of the 5294 Control Unit.

*IBM 3179 Model 2 Color Display Station User's Guide*, GA18-2387, provides step-by-step instructions for the setup and checkout of the display station, describes how to operate the display station, and helps to isolate and correct conditions when the display station does not operate as expected.

*IBM 3180 Display Station Model 2 User's Guide*, GA21-9469, provides step-by-step instructions for the setup and checkout of the display station, describes how to operate the display station, and helps to isolate and correct conditions when the display station does not operate as expected.

*IBM 3196 Display Station User's Guide*, GA18-2482, describes how to operate the display station.

*IBM 3196 Display Station Setup Instructions*, GA18-2488, provides step-by-step instructions for the setup and checkout of the display station.

*IBM 3196 Display Station Problem Solving Guide*, GA18-2483, helps to isolate and correct conditions when the display station does not operate as expected.

*IBM 3197 Model C Color Display Station User's Guide,* GA18-2559, provides operators and supervisory personnel with information on operating the 3197 Model C Color Display Station, and how to perform error recovery procedures.

*IBM 4210 Printer Guide to Operations*, SC31-3783, provides step-by-step instructions for the setup and checkout of the printer, describes the procedures required to operate the printer, and helps to isolate and correct conditions when the printer does not operate as expected.

*IBM 4224 Printer Setup Information*, GC31-3607, provides step-by-step instructions for the setup and checkout of the 4224 Printer.

*IBM 5219 Printer D01/D02 Setup Procedures/Operating Guide*, GA23-1019, describes how to set up, check out, operate, and correct situations when the 5219 Printer does not operate as expected. It also contains instructions on how to attach or remove paper-handling features on the printer.

*IBM 5224 Printer Models 1 and 2 Setup Instructions,* GA34-0093, provides step-by-step instructions for the setup, checkout, relocation, or removal of the 5224 Printer.

*IBM Multistation 5550 Chinese 5250 Personal Computer User's Guide* (Taiwan and Hong Kong, 5600-485; People's Republic of China, 5600-490) or the *IBM Multistation 5550 Hangeul 5250 Personal Computer User's Guide,* 5600-480, provides operator information about the 5550 system when it is used as a work station.

*IBM 5262 Printer Model 1 Setup Instructions*, GA24-3978, gives step-by-step instructions for the setup of the 5262 Model 1 Printer.

**Note:** This manual may not contain detailed information on several of the devices mentioned here. For complete product information, refer to the related manuals.

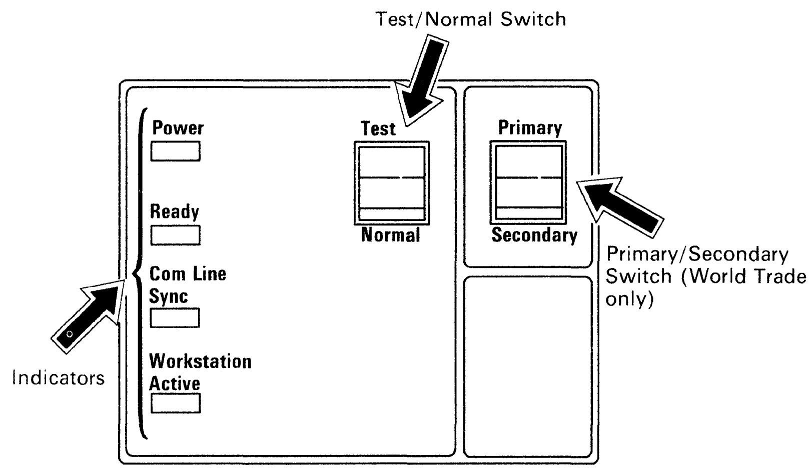
# Chapter 1. Introduction

## What is the 5294 Control Unit?

The 5294 Control Unit is a work station controller and communications unit for remote attachment of multiple display stations and printers. The 5294 Control Unit connects a cluster of work stations (display stations and printers) to a data communications network facility for online interactive operations.

## The Control Panel

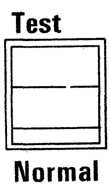
The 5294 Control Unit control panel is shown in the following illustration. The switches control the operation of the 5294 Control Unit, and the indicators provide information about the status of both the 5294 Control Unit and the attached work stations.



## Switches

The switches control the operation as follows:

### Test/Normal Switch




The Test/Normal switch has two positions:

Normal: This position is used for all operations except the diagnostic and configuration setup procedures.

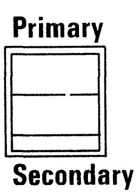
Test: This position is used for diagnostic and configuration setup procedures.

The configuration setup procedure can be performed if the Test/Normal switch is in the Test position when power is turned on.

An extended test routine can be run if the Test/Normal switch is set to the Test position while power is on.

For information about the configuration setup operation, refer to the *IBM 5294 Control Unit Setup Procedure*, GA21-9369.

### Primary/Secondary Switch (World Trade Only)



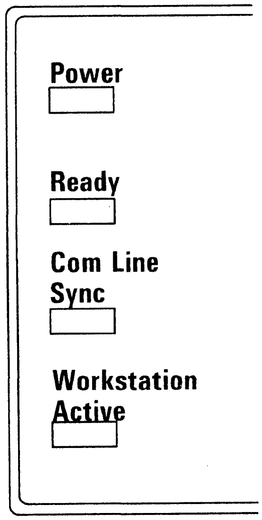

The Primary/Secondary switch has two positions:

Primary: This position allows the modem to operate at its maximum rated data transmission speed.

Secondary: If the modem supports the rate select signal, this position reduces the data transmission speed of the modem to one-half the primary speed. For example, if the data transmission speed is 2400 bps in the primary position, then the data transmission speed will be 1200 bps in the secondary position.

**Note:** This switch is provided only on World Trade control units with an EIA/CCITT interface adapter.

## Indicators




The indicators provide the following status information:

Power: This indicator comes on approximately two seconds after the Power switch is set on. This indicator is off when the Power switch is set off or when a power failure occurs.

Ready: This indicator is on when the 5294 Control Unit is ready to be used. This indicator is off when the Power switch is set off or when the diagnostics detect an operational problem.

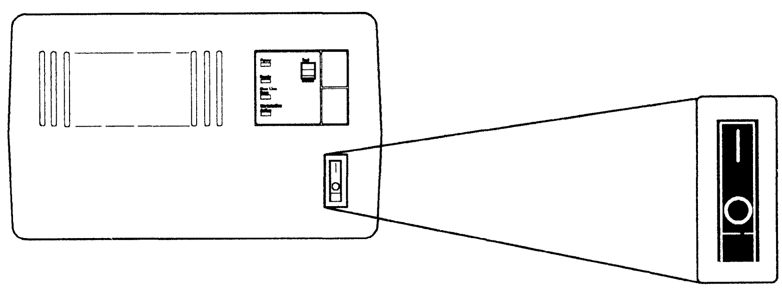
Com Line Sync: This indicator blinks when the 5294 Control Unit detects activity on the communications line.

Work Station Active: This indicator is on when the 5294 Control Unit is communicating with one or more attached display stations or printers.

# Power Switch



The Power switch is located below the control panel and has two positions:



|: Press the top half of the switch to turn power on the 5294 Control Unit.

O: Press the bottom half of the switch to turn power off the 5294 Control Unit.

# Chapter 2. Communications Procedures

The procedures described in this chapter are for starting, restarting, and terminating data communications from the 5294 Control Unit to a host system.

Some of these procedures require that you enter data from a display station keyboard; other procedures do not have this requirement and, therefore, the sign-on screen appears on the display station shortly after the 5294 Control Unit Power switch is set on.

Two levels of the same communications procedures are presented in this chapter. The first part of this chapter contains flow diagrams and reference information for each procedure. The second part of this chapter contains a detailed step-by-step guide through each procedure.

If you have not used one of these procedures to start communications, it is recommended that you talk to the person responsible for planning the installation of the 5294 Control Unit. You should review this chapter with this person to find out which procedure you should use, and also find out the data required for the procedure.

If you are familiar with starting data communications on various types of networks,[1] you may want to use only the flow diagrams and the reference information. If so, see the appropriate flow diagram (SDLC, X.25, or X.21 switched).

If you are not familiar with starting data communications, you may want to go directly to the step-by-step guide and use the detailed level of the communications procedures. If so, see "Details of Communications Procedures" in the latter part of this chapter.

Following are overviews of the Synchronous Data Link Control (SDLC), X.25, and X.21 switched communications procedures. Each overview consists of:

- High-level diagram of the communications procedure
- Definition of:
  - Protocols
  - Circuit types
  - Commands (X.25 and X.21 switched)
  - Parameters (X.25 only X.21 switched).
- Examples.

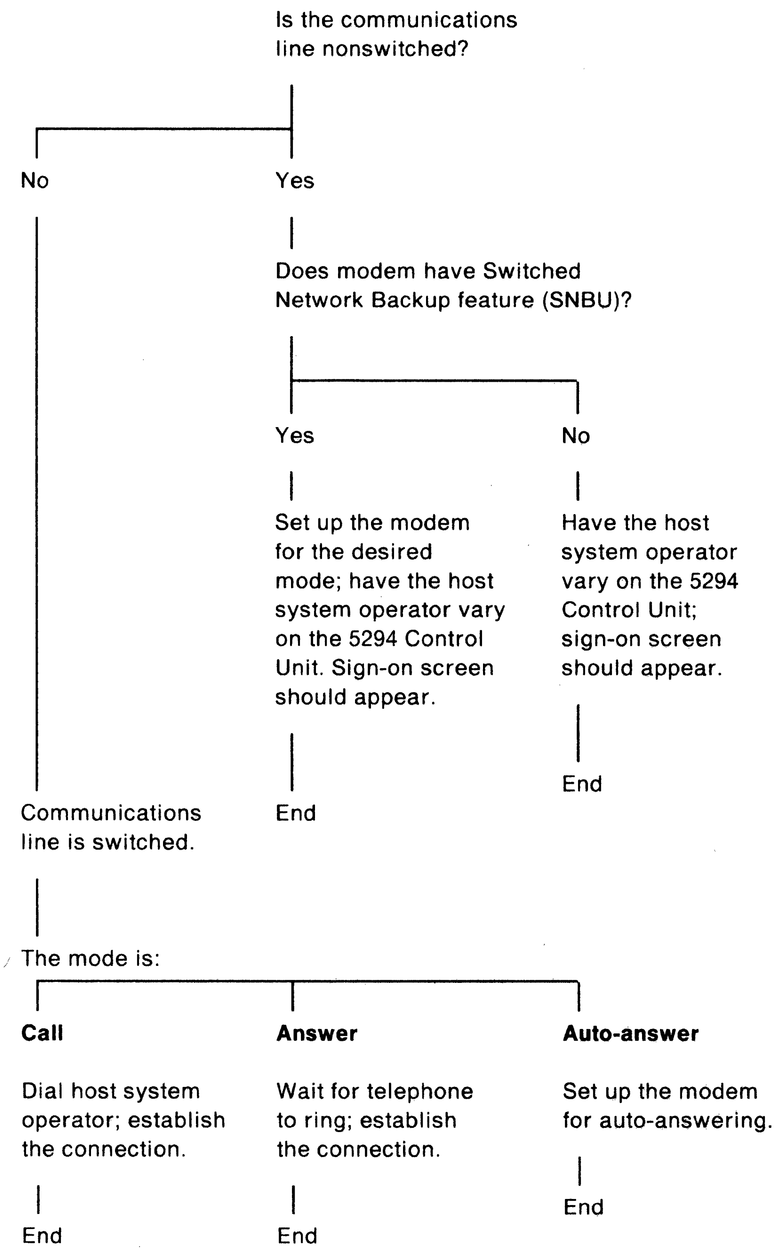
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1 The term network has at least two meanings. A *public network* is a network established and operated by common carriers or telecommunications administrations for the specific purpose of providing circuit-switched, packet switched, and nonswitched-circuit services to the public. A *user applications network* is a configuration of data processing products (such as processing units or work stations) established and operated by users for the purpose of data processing or information exchange; such a network may use transport services offered by common carriers or telecommunications administrations.

# SDLC Flow Diagram

The following diagram presents the flow for establishing a communications line for SDLC communications. Before you attempt to follow the flow of the diagram, you should know whether:

- The communications line is switched or nonswitched.
- The Switched Network Backup feature is installed on the modem.
- The mode is call, answer, or auto-answer.



## Definition of SDLC Terms

Nonswitched: In data communications, pertains to a channel or a line that is permanently connected, always available, and does not require dialing to establish communications.

Switched: In data communications, pertains to a channel or a line that uses the same equipment and transmission lines used for telephone communications. Thus, dialing is required to establish communications.

Synchronous Data Link Control (SDLC): A protocol for the management of information transfer over a data communications channel or line.

Switched Network Backup (SNBU): This feature applies to a nonswitched modem that can be set to operate on a switched line.

## Example of SDLC (Answer Mode) Procedure

1. Ensure that the modem is correctly set up and powered on.

2. Set the Mode switch on the modem to the Talk position.

3. Wait for call.

4. Answer the call when the telephone rings.

    a. Lift the handset from the cradle.
    b. Pull the exclusion key.

5. Set the Mode switch on the modem to the Data position.

6. Put the handset in the cradle.

7. Procedure is complete; sign on the system.

# X.25 Flow Diagram

Figure 1 presents the flow of the X.25 Open, Answer, Call and Detach commands. The optional parameters (control characters and variable values) that can be entered for each command are also shown on the diagram.

When an optional parameter is entered from a display station keyboard, the parameter variable overrides (for this connection only) the values that were specified during the customer setup procedure. When the connection is terminated, the optional parameters that were entered from the keyboard are canceled and the 5294 Control Unit configuration is now the same as it was before the parameters were entered.

Before you attempt to determine which parameters can be entered from a display station keyboard, you should know:

- Which command you want to enter.
- Whether manual options are allowed.
- Whether flow control options are allowed.
- Whether switched virtual circuit (SVC) or multiple permanent virtual circuits (PVCs) are allowed.
- The data that applies to each of the optional parameter variables; some of the data must be obtained from the network supplier.
- The circuit type (PVC, SVC, or multiple SVC/PVC) you want to establish.

If manual and flow control options are allowed, the parameters can be entered as follows:

- The control character (O, A, C, or D) for the command must be the first character entered.
- The parameters can be entered in any sequence; a comma must precede the control character for the parameter.
- The parameters can be entered in any combination. (The combination is determined by the application.)
- The network address must be supplied on a Call command.

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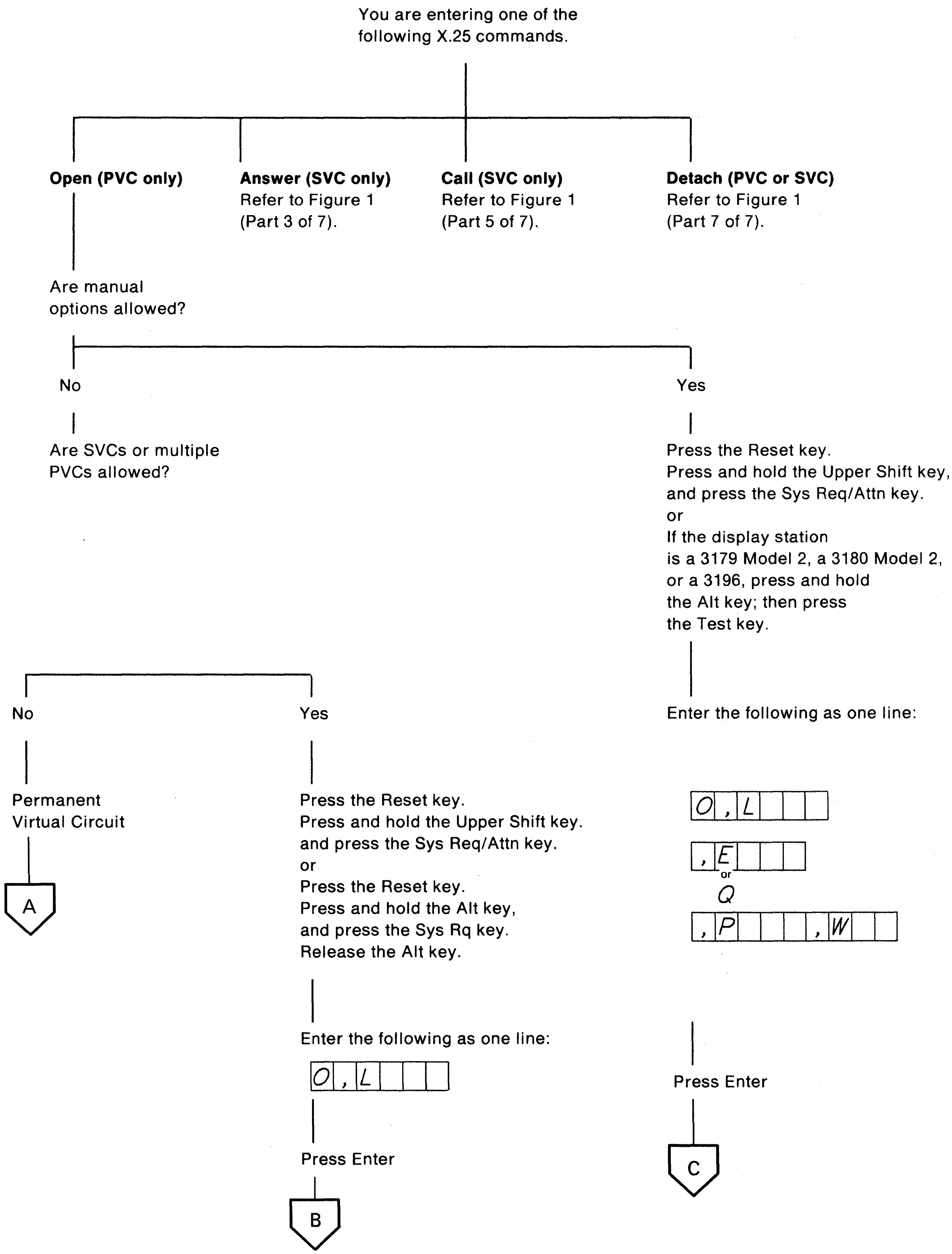



**Figure 1 (Part 1 of 7). X.25 Flow Diagram**

**A**

Is this a retry?

Yes

Press the Reset key.
Press and hold the Upper Shift key,
and press the Sys Req/Attn key.
or
Press the Reset key.
Press and hold the Alt key,
and press the Sys Rq key.
Release the Alt key.

Enter

| 0 | | | | | |
|---|---|---|---|---|---|

Press Enter

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

No

Sign-on screen should appear soon after the host system operator varies on the 5294 Control Unit.

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

**B**

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

**C**

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

**Figure 1 (Part 2 of 7). X.25 Flow Diagram**

**Answer Command**

Are manual options allowed?

**No**

Press the Reset key.
Press and hold the Upper Shift key, and press the Sys Req/Attn key.
or
Press the Reset key.
Press and hold the Alt key, and press the Sys Rq key.
Release the Alt key.

Enter the following as one line:

| A | , | N | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| , | X | | | | | | | |
|---|---|---|---|---|---|---|---|---|

Press Enter

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

**Yes**

Are flow control options allowed?

**No**

Press the Reset key.
Press and hold the Upper Shift key, and press the Sys Req/Attn key.
or
Press the Reset key.
Press and hold the Alt key, and press the Sys Rq Key.
Release the Alt key.

A

**Yes**

Press the Reset key.
Press and hold the upper Shift key, and press the Sys Req/Attn key.
or
Press the Reset key.
Press and hold the Alt key, and press the Sys Rq key.
Release the Alt key.

B

**Figure 1 (Part 3 of 7). X.25 Flow Diagram**

A

Enter the following as one line:

A,N

,X ,E

Press Enter

A sign-on screen should appear shortly after the host system operator varies on the 5294 Control Unit.

End

B

Enter the following as one line:

A,N

,X ,E

,P ,W

Press Enter

A sign-on screen should appear shortly after the host system operator varies on the 5294 Control Unit.

End

**Figure 1 (Part 4 of 7). X.25 Flow Diagram**

**Call Command**

Are manual options allowed?

**No**

Press the Reset key.
Press and hold the Upper Shift key, and press the Sys Req/Attn key.
or
Press Reset key.
Press and hold the Alt key, and press the Sys Rq key.
Release the Alt key.

Enter the following as one line:

| C | , | N | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| , | X | | | | | | | | | , | L | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Press Enter

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

**Yes**

Are flow control options allowed?

**No**

Press the Reset key.
Press and hold the Upper Shift key, and press the Sys Req/Attn key.
or
Press Reset key.
Press and hold the Alt key, and press the Sys Rq key.
Release the Alt key.

A

**Yes**

Press the Reset key.
Press and hold the Upper Shift key, and press the Sys Req/Attn key.
or
Press Reset key.
Press and hold the Alt key, and press the Sys Rq key.
Release the Alt key.

B

**Figure 1 (Part 5 of 7). X.25 Flow Diagram**

**A**

Enter the following as one line:

```
C,N
,X        ,L   ,U
 ,R,E    ,F02  ,F44
    or
    Q
```

Press Enter

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

**B**

Enter the following as one line:

```
C,N
,X        ,L   ,U
 ,R,E    ,F02  ,F44
    or
    Q
    ,P   ,W
```

Press Enter

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

**Figure 1 (Part 6 of 7). X.25 Flow Diagram**

**Detach Command**

Press the Reset key.
Press and hold the Upper Shift key,
and press the Sys Req/Attn key.
Release the Upper Shift key.
or
Press the Reset key.
Press and hold the Alt key,
and press the Sys Rq key.
Release the Alt key.

Enter a [D]

Press the Enter key.

End

**Note:** One of the uses of the Detach command is to terminate an Answer command that was presented to the network, but remains unanswered.

**Figure 1 (Part 7 of 7). X.25 Flow Diagram**

## Definition of X.25 Terms

### Circuit Types

Permanent virtual circuit (PVC): This circuit type is the packet switching equivalent of a nonswitched line. The work station and its host system appear to the user to be permanently connected.

Switched virtual circuit (SVC): This circuit type is the packet switching equivalent of a switched line; dialing is not required. The circuit is selected by specific network addresses.

### Commands

Open (PVC only): This command is entered from a display station keyboard, and when processed, establishes a permanent virtual circuit (PVC) between two data stations; control character is alphabetic O.

Answer (SVC only): This command is entered from a display station keyboard, and when processed, places a data station in answer mode; control character is A.

Call (SVC only): This command is entered from a display station keyboard, and when processed, places a data station in call mode; control character is C.

Detach (PVC or SVC): This command is entered from a display station keyboard, and when processed, terminates the data link between two data stations when no active sessions are established between the stations; control character is D.

### Network Options Control

Flow control options (SVC only): When flow control options are allowed, the packet size and window size parameters can be entered from a display station keyboard, provided that manual options are also allowed.

Manual options: When manual options are allowed, optional parameters can be entered from a display station keyboard.

### Parameters

ELLC: This parameter defines a logical link protocol. The control character is E; the variable can be 100 through 999 (the number of seconds allowed for error recovery between the host system and the 5294 Control Unit).

Facility: This parameter allows 5294 Control Unit and host dependent parameter information to be passed. The control character is F; the variable is network dependent.

Logical channel identification (ID): This parameter specifies which logical channel is to be used on a Call or Open command. The control character is L; the 3-character variable is supplied by the network for each circuit subscription. The default value is 001.

Network address: This parameter is a variable length field (15 characters maximum) that specifies which host system is to communicate with which 5294 Control Unit when a communications connection is established. The control character is N; the first address entered is the host address. A second address (local address) may also be required by the network. If a second address is required, a hyphen must be entered between the first and second addresses. The second address is also variable in length (15 characters maximum).

Packet size: This parameter specifies the size allocated to the user data area in a packet. The control character is P; if the flow control parameter is on, the 3-character variable can be changed when a connection is established. The variable is determined by the network requirements and supplied by the network.

Physical services header (PSH): This logical link protocol makes an X.25 virtual circuit appear as an SDLC link to the higher levels of SNA. PSH is used if ELLC or QLLC are not selected. There is no control parameter.

QLLC: This parameter defines a logical link protocol. The control character is Q; there is no variable associated with the control character.

Reverse charge: This parameter specifies whether the host location is to be billed for the charges incurred for the communications connection. The control character is R; there is no variable associated with the control character.

Closed user group ID: This parameter defines a group of locations that can only communicate with members of the group. However, it is possible to define a different closed user group for a different application. The control character is U; the 2-character variable is supplied by the network.

Packet window size: This parameter specifies the number of packets that can be pending between the 5294 Control Unit and the network. When the number is reached, communications are suspended until the pending packets are acknowledged. The control character is W; the length of the variable is 2 characters.

Password: This parameter is used by the host system to allow access to the application program. The control character is X; the length of the variable can be from 1 through 8 characters.

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# Entering X.25 Commands

X.25 commands and associated parameters can be entered from any display station attached to the 5294 Control Unit. The rules for entering these commands are as follows:

- Commands are entered in abbreviated form; for example, O=Open, A=Answer, C=Call, and D=Detach.
- The command O, A, C, or D must be the first character entered.
- Parameters can be entered in any sequence.
- A comma serves as the delimiter and must be entered between consecutive parameters as well as between the command and the first parameter.
- If a parameter does not fill up all the allocated space, the parameter can be entered with or without the remaining space. For example, a password parameter ,X123____ can be entered as ,X123_____ or as ,X123.
- If there is a variable associated with a parameter, you must enter the variable if you enter the control character. For example, if you wish to enter a closed user group parameter, you must enter the control character U and then identification number U54.
- The 5294 Control Unit must be properly configured if manual options are to be entered from the keyboard.
- The 5294 Control Unit must be configured to allow both manual options and flow control options before packet size or packet window size can be entered.
- The host network address must be supplied on each Call command.

If you do not follow the rules for entering X.25 commands, a 10xxxx error code occurs.

Refer to Figure 2 for examples that provide the procedure for entering X.25 commands.

**Open Command With Optional Parameters Example**

1. Press the Reset key.

2. Press and hold the Upper Shift key.

3. Press the Sys Req/Attn key.

   or

1. Press the Reset key.

2. Press and hold the Alt key.

3. Press the Sys Rq key, then release the Alt key.

4. Enter the following Open command, Q logical link protocol, logical channel identification, and packet size parameters (manual options are allowed; flow control options are not allowed):

   O , Q , L 9 A C , P 2 5 6

   The command can be entered on the single line format at the top of the display screen. The data is entered as follows:

   *O,Q,L9AC,P256*

5. Press the Enter key.

The procedure is complete.

If you have unexpected results, you can:

- Retry the procedure.
- Go to "Chapter 3. Problem Analysis and Resolution."
- Go to "Details of Communications Procedures" later in this chapter and follow the step-by-step procedure.

**Figure 2 (Part 1 of 4). Entering X.25 Commands**

**Answer Command With Optional Parameters Example**

1. Press the Reset key.

2. Press and hold the Upper Shift key.

3. Press the Sys Req/Attn key.

   or

1. Press the Reset key.

2. Press and hold the Alt key.

3. Press the Sys Rq key, then release the Alt key.

4. Enter the following Answer command with a host network address parameter and a password parameter specified (manual options are allowed; flow control options are not allowed):

   | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
   |---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
   | A | , | N | 8 | 8 | 8 | 8 | 7 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | | | | , | X | 5 | 2 | 9 | 4 | U | N | I | T |

   The command can be entered on the single line format at the top of the display screen. The data can be entered with or without blanks. This example shows the data entered with blanks.

   *A,N888877776666 ,X5294UNIT*

5. Press the Enter key.

The procedure is complete.

If you have unexpected results, you can:

- Retry the procedure.
- Go to "Chapter 3. Problem Analysis and Resolution."
- Go to "Details of Communications Procedures" later in this chapter and follow the step-by-step procedure.

**Figure 2 (Part 2 of 4). Entering X.25 Commands**

**Call Command Without Optional Parameters Example**

1. Press the Reset key.

2. Press and hold the Upper Shift key.

3. Press the Sys Req/Attn key.

   or

1. Press the Reset key.

2. Press and hold the Alt key.

3. Press the Sys Rq key, then release the Alt key.

4. Enter the following Call command and the required host network address (manual and flow control options are allowed but no optional parameters are specified):

   | | | | | | | | | | | | | | | | | | |
   |---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
   | C | , | N | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 6 | 5 | 4 | 8 | | |

   The command can be entered on the single line format at the top of the display screen. The data can be entered with or without blanks. For example:

   *C,N9876543216548____* -or- *C,N9876543216548*

5. Press the Enter key.

The procedure is complete.

If you have unexpected results, you can:

- Retry the procedure.

- Go to "Chapter 3. Problem Analysis and Resolution."

- Go to "Details of Communications Procedures" later in this chapter and follow the step-by-step procedure.

**Figure 2 (Part 3 of 4). Entering X.25 Commands**

**Call Command With Optional Parameters Example**

1. Press the Reset key.
2. Press and hold the Upper Shift key.
3. Press the Sys Req/Attn key.

or

1. Press the Reset key.
2. Press and hold the Alt key.
3. Press the Sys Rq key, then release the Alt key.
4. Enter the following Call command and associated parameters (manual and flow control options are allowed):

```
C,N123456         ,X321CBA  
,LA7F,U34,R,E175,F023C,F4456
78,P128,W05
```

The command can be entered on the single line format with or without blanks. For example:

*C,N123456,X321CBA,LA7F,U34,R,E175,F023C,F445678,P128,W05*

5. Press the Enter key.

The procedure is complete.

If you have unexpected results, you can:

- Retry the procedure.
- Go to "Chapter 3. Problem Analysis and Resolution."
- Go to "Details of Communications Procedures" later in this chapter and follow the step-by-step procedure.

**Figure 2 (Part 4 of 4). Entering X.25 Commands**

# X.21 Switched Flow Diagram

Figure 3 presents the flow for establishing a data link for the X.21 Switched Support feature. The diagram also presents the flow for changing subscription parameters and detaching from the network.

When you change subscription parameters the optional parameter you enter from the display station keyboard overrides the default value specified for your subscription. The optional parameter you enter from the keyboard usually remains in effect (depending on the network subscription) until you change it by entering a different option for that parameter.

Do you want to establish communications with the host system or detach from the network?

**Establish Communications**
(Subscription parameters are correct.)

Are you placing a call from the 5294 Control Unit?

No

A

Yes

B

**Establish Communications**
(Change subscription parameters.)

Refer to Figure 3 (Part 3 of 4).

**Detach**
Refer to Figure 3 (Part 4 of 4).

**Figure 3 (Part 1 of 4). X.21 Switched Flow Diagram**

A

(Answer mode)

A sign-on screen should appear shortly after the host system operator varies on the 5295 Control Unit.

End

B

(Call mode)

Is your network subscription set up for direct call?

No

Press the Reset key.
Press and hold the Upper Shift key, and press the Sys Req/Attn key.
or
Press the Reset key.
Press and hold the Alt key, and press the Sys Rq key.
Release the Alt key.

Enter the network address.

Press Enter

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

Yes

Press the Reset key.
Press and hold the Upper Shift key, and press the Sys Req/Attn key.
or
Press Reset key.
Press and hold the Alt key, and press the Sys Rq key.
Release the Alt key.

Press Enter

If the sign-on screen does not appear in two minutes, call the host system operator and ensure that the 5294 Control Unit is varied on.

End

**Figure 3 (Part 2 of 4). X.21 Switched Flow Diagram**

**Establish Communications**
(Change subscription parameters.)

Press the Reset key.
Press and hold the Upper Shift key,
and press the Sys Req/Attn key.
or
Press the Reset key.
Press and hold the Alt key,
and press the Sys Rq key.
Release the Alt key.

Enter the facility registration for
the parameter you want to change.

Press Enter

If the sign-on screen does not appear
in two minutes, call the host system
operator and ensure that the 5294
Control Unit is varied on.

End

**Figure 3 (Part 3 of 4). X.21 Switched Flow Diagram**

**Detach Command**

Press the Reset key.
Press and hold the Upper Shift key,
and press the Sys Req/Attn key.
or
Press the Reset key.
Press and hold the Alt key,
and press the Sys Rq key.
Release the Alt key.

Enter a [D] .

Release the Upper Shift key.
Press the Enter key.

End

**Figure 3 (Part 4 of 4). X.21 Switched Flow Diagram**

## Definition of X.21 Switched Terms

Call: This keying sequence is entered from the display station keyboard, and when processed, establishes a data link through the X.21 switched network with a remote host system.

Closed user group: This optional parameter defines a group of locations that can communicate only with members of the group. It is possible, however, to define a different closed user group for a different application. The facility registration and the 2-character facility request code are supplied by the network. They may vary from network to network.

Detach (command): This command is entered from the display station keyboard, and when processed, terminates the data link if no active sessions are established. The control character is D.

Direct call request: Direct call request allows calls to be established without entering the network address of the host system.

Facility registration: Facility registration changes subscription parameters (for example, the closed user group or redirection of calls).

Facility request code: A 1- or 2- digit number representing a subscription parameter.

Network address: This parameter is a variable length field that specifies the address of the host system that the 5294 Control Unit communicates with when the data link is established.

Redirection of call: This optional parameter allows incoming calls to be directed to another number. The network subscription must include redirection of call.

# Entering X.21 Switched Commands

**Example of Establishing Communications on the X.21 Switched Network (Subscription Parameters are Correct)**

1. Press the Reset key.

2. Press and hold the Upper Shift key.

3. Press the Sys Req/Attn key.

   or

1. Press Reset key.

2. Press and hold the Alt key.

3. Press the Sys Rq key, then release the Alt key.

4. Enter the network address.

   | 1 | 2 | 3 | 4 | 5 | 6 |
   |---|---|---|---|---|---|

5. Have the host system operator vary on the 5294 Control Unit.

6. Press the Enter key.

The procedure is complete.

If you have unexpected results you can:

- Retry the procedure.

- Go to "Chapter 3. Problem Analysis and Resolution."

- Go to "Details of Communications Procedures" later in this chapter, and follow the step-by-step procedure.

**Figure 4 (Part 1 of 2). Entering X.21 Switched Commands**

**Example of Establishing Communications on the X.21 Switched Network (Changing Subscription Parameters)**

1. Press the Reset Key.

2. Press and hold the Upper Shift key.

3. Press the Sys Req/Attn key.

   or

1. Press Reset key.

2. Press and hold the Alt key.

3. Press the Sys Rq key, then release the Alt key.

4. Enter a 1 (the facility request code to change the closed user group) followed by a slash (/).

   Enter 32 (the code for the new closed user group) followed by a minus (-).

   | | | | | |
   |---|---|---|---|---|
   | 1 | / | 3 | 2 | – |

   **Note:** The facility request codes and formats may vary, depending on the network.

5. Press the Enter key.

The procedure is complete.

If you have unexpected results you can:

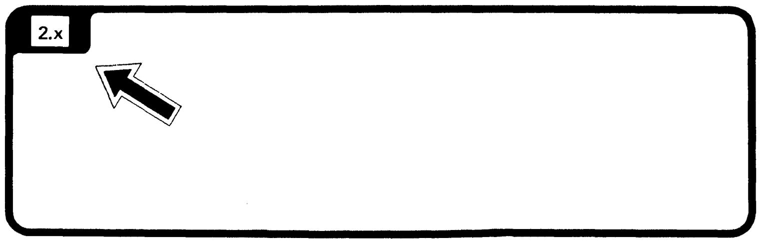
- Retry the procedure.
- Go to "Chapter 3. Problem Analysis and Resolution."
- Go to "Details of Communications Procedures" later in this chapter and follow the step-by-step procedure.

**Figure 4 (Part 2 of 2). Entering X.21 Switched Commands**

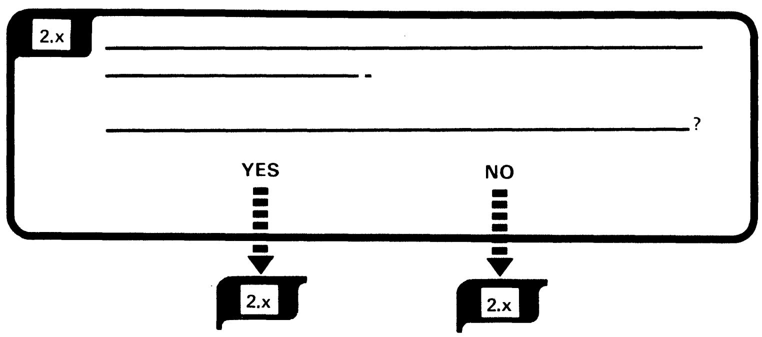
# Details of Communications Procedures

READ CAREFULLY: This information will help you start, restart, or terminate data communications from the 5294 Control Unit to a host system if you follow every instruction and accurately answer each question.

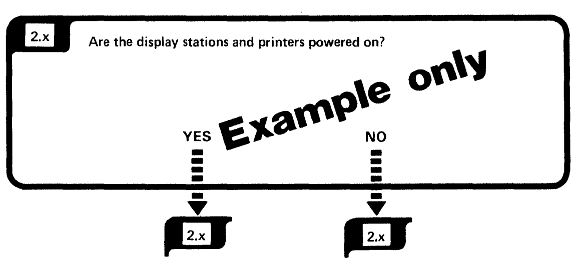
The instructions and questions are contained in frames. Each frame is identified by a number in the upper-left corner. The digit to the left of the decimal point specifies the chapter; the digit(s) to the right of the decimal point specifies the frame within the chapter.




FOLLOW THE SEQUENCE: Always answer one question at a time. When instructions precede the question, follow the instructions exactly in the order given before you answer the question.




The text and illustrations shown to the right of a frame are additional information you might need to answer the question in the frame. Always read the instructions in the frame first, and then the additional information.




Sometimes this manual will use the words <u>work station</u>. Work station means either a printer or a display station.

**Note:** Depending on your answer to the question, you might not go to the next sequential frame.

A symbol that appears in the text like **2.x** means go to that frame.

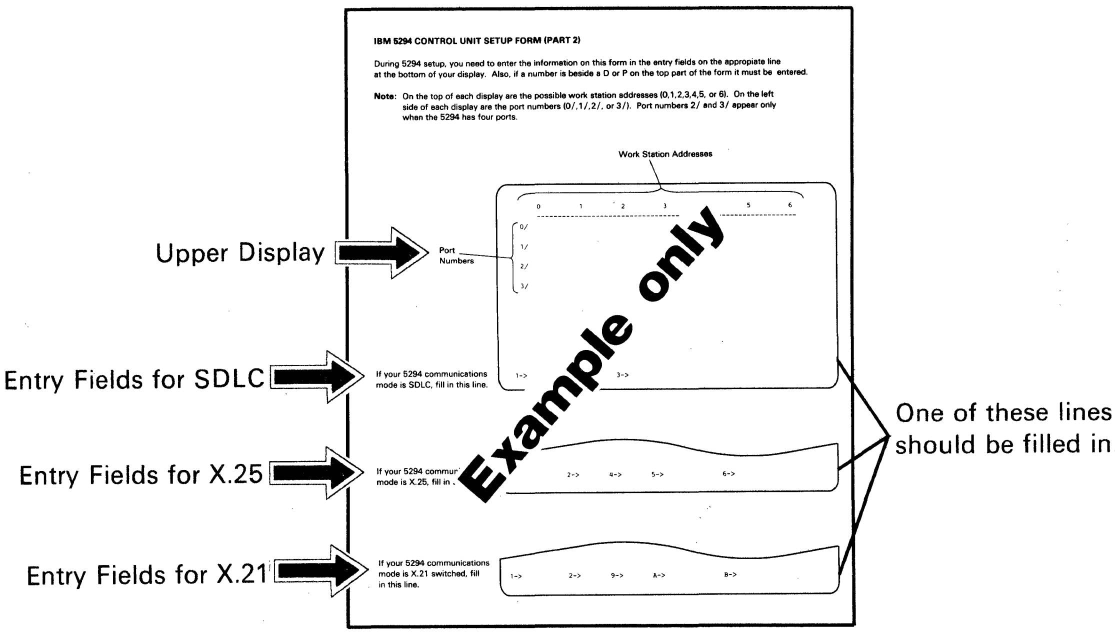
A broken arrow like ▮▮▮▮▮▮▶ is used to show action such as push, pull, turn, go to, and continuation of a frame.

An arrow like ➡ is used to point out or locate something.

To continue, go to **2.1**

## 2.1

Refer to Part 2 of the IBM 5294 Control Unit Setup Form.
Locate the filled in line on that form.




**Which type of data link do you have?**

**SDLC** ▮▮▮▮▮▮▶ **2.2**

**X.25** ▮▮▮▮▮▮▶ **2.5**

**X.21 Switched** ▮▮▮▮▮▮▶ **2.23**

If the 5294 Control Unit Setup Form is not available, you can obtain some of the required information from the setup screen. To display the setup screen, do the following:

1. Set the 5294 Control Unit Power switch to Off.

2. Set the 5294 Control Unit Test/Normal switch to Test.

3. Set the 5294 Control Unit Power switch to On.

4. Press the Command key, and then the Character Backspace key on a 5251 Model 11, a 5291, or a 5292 Model 1 or Model 2 Display Station. (Press and hold the Alt key; then press the Test key on a 3180 Display Station Model 2 or a 3196 Display Station.) Refer to the *IBM Multistation 5550-5250 Personal Computer User's Guide*.

5. The setup screen should now be displayed.

6. Refer to the setup screen to answer the question in the procedure. The bottom line displayed on the setup screen should match the entry fields for one of the data links shown in the procedure.

**2.2**

Look at position 1 of entry field 3 -> on the setup form (screen).

```
1->          2->          3-> ?xxxxxxxxx
```

**Is there a 0 (zero) in position 1 of field 3 ->?**

**YES** → **2.3**

**NO** → **2.4**

YES answer: Communications line is nonswitched.

NO answer: Communications line is switched.

2.3

**Do the following:**

**Note:** You may skip steps 1, 2, 3, and 4 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Ensure that the display stations and printers are powered on.
2. Set the 5294 Control Unit Power switch to Off.
3. Set the 5294 Control Unit Test/Normal switch to Normal.
4. Set the 5294 Control Unit Power switch to On.
5. In approximately 30 seconds, the sign-on screen should be displayed.
6. If the sign-on screen does not appear, call the host system operator and have the 5294 Control Unit varied on.
7. If the sign-on screen still does not appear, go to Chapter 3. Problem Analysis and Resolution.

Some modems have a Switched Network Backup (SNBU) feature. Ensure that the modem is set up according to the manufacturers' specifications, and that power is on.

If you are not sure that the modem is set up correctly, contact the host system operator.

## 2.4 Are you dialing, manually answering, or auto-answering?

| Dialing | Manual answering | Autoanswering |
|---|---|---|
| 1. Set the Mode switch on the modem to the Talk position.<br>2. Lift the handset from the telephone and pull up the exclusion key (a key on the telephone located under handset that is used to establish communications).<br>3. Dial the host site number.<br>4. When the host site is ready, you will hear the answer tone.[2]<br>5. Wait until the answer tone ends.<br>6. Set the Mode switch on the modem to the Data position.<br>7. Hang up the handset.<br>**The procedure is complete.**<br>A sign-on screen should be displayed. Sign on by using the instructions provided by the host system planner. If a sign-on screen is not displayed in 30 seconds, call the host system operator and ensure that the 5294 Control Unit is varied on. If the sign-on still does not appear, go to Chapter 3. Problem Analysis and Resolution. | 1. Set the Mode switch on the modem to the Talk position.<br>2. Wait for the call.<br>3. Answer the telephone when it rings.<br>4. Lift the handset from the telephone and pull up the exclusion key (a key on the telephone located under the handset that is used to establish communications).<br>5. When you and the host site are ready, set the Mode switch on the modem to the Data position and hang up the handset.[2]<br>**The procedure is complete.**<br>A sign-on screen should be displayed. Sign on by using the instructions provided by the host system planner. If a sign-on screen does not appear, go to Chapter 3. Problem Analysis and Resolution. | Set the Mode switch on the modem to the Data position.<br>The 5294 Control Unit is now ready to automatically answer an incoming call.<br>A sign-on screen should be displayed when the host system program calls and establishes communication. If a sign-on screen does not appear, go to Chapter 3. Problem Analysis and Resolution. |

2 When the 3872 is used, the location receiving the call must go to data (by hanging up the handset) first.

**2.5**

If you have a completed Applications Setup Form, follow the instructions on the form, then go to **2.22**.

If you do not have a completed Applications Setup Form, go to the indicated frame for the command you want to enter.

| Open (PVC only) | Answer (SVC only) | Call (SVC only) | Detach (PVC or SVC) |
|---|---|---|---|
| **2.6** | **2.11** | **2.16** | **2.21** |

Some applications require that a command be entered from a display station keyboard. The host system operator must provide you with the command and the appropriate parameters to be entered.

If the application does not require that a command be entered, go to frame **2.8**.

**2.6**

Look at position 4 of entry field 5 -> on the setup form (screen).

```
1->        2->        4->        5-> xxx?xxx        6->
```

**Is there a 0 (zero) in position 4 of field 5 ->?**

| YES | NO |
|---|---|
| **2.7** | **2.10** |

YES answer: Manual options are not allowed.

NO answer: Manual options are allowed.

**2.7**

Look at position 2 of entry field 5 -> on the setup form (screen).

```
1->          2->          4->            5-> x?xxxxx         6->
```

**Is there a 1 (one) in position 2 of field 5 ->?**

**YES** → **2.8**

**NO** → **2.9**

YES answer: Circuit type is permanent virtual circuit (PVC).

NO answer: An Open command can establish only a permanent virtual circuit (PVC).

2.8

**Do the following:**

**Note:** You may skip steps 1, 2, 3, and 4 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Ensure that the display stations and printers are powered on.
2. Set the 5294 Control Unit Power switch to Off.
3. Set the 5294 Control Unit Test/Normal switch to Normal.
4. Set the 5294 Control Unit Power switch to On.
5. Do not do this step unless you are reestablishing a communications connection (an error code is displayed or some other reason).
   a. Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.
   b. Press and hold the Upper Shift key and press Sys Req/Attn to display the single line format at the top of the screen.
      or
      Press and hold the Alt key, and press the Sys Rq key. Release the Alt key.
   c. Enter an O (alphabetic O).
   d. Press the Enter key.

***Frame 2.8 Continued***

A permanent virtual circuit is established by this procedure. Manual options are not allowed.

6. In approximately 2 minutes, the sign-on screen should be displayed. The communications procedure is complete.

7. If the sign-on screen does not appear, call the host system operator and have the 5294 Control Unit varied on.

8. If the sign-on screen still does not appear, go to Chapter 3. Problem Analysis and Resolution.

2.9

**Do the following:**

**Note:** You may skip steps 1, 2, and 3 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Set the 5294 Control Unit Power switch to Off.

2. Set the 5294 Control Unit Test/Normal switch to Normal.

3. Set the 5294 Control Unit Power switch to On.

4. Ask the host system operator to vary on the 5294 Control Unit and to provide you with the parameters that are required for this application.
   a. Logical channel identification (valid characters are 3 hexadecimal values--0 through 9, A through F [L| | | ]).

***Frame 2.9 Continued***

This procedure is for an X.25 Open command.

- An Open command can establish only a permanent virtual circuit.
- Manual options are not allowed.
- Flow control options are not allowed.

5. Fill in the blanks on the Applications Setup Form with the information obtained from the host system operator; follow the instructions on the form.

**APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION**

Setup instructions for the following applications:

______________________________________

______________________________________

______________________________________

Host Contact ____________________________ Telephone ____________

**A** Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

**B** Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

**C** Enter the following as one line:

| O | , | L | | | | |
|---|---|---|---|---|---|---|

**D** Press Enter.

6. Go to frame **2.22**.

Extra copies of the Applications Setup Form are provided in Appendix B.

Refer to *Entering X.25 Commands* for rules and examples.

**2.10**

**Do the following:**

**Note:** You may skip steps 1, 2, and 3 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Set the 5294 Control Unit Power switch to Off.

2. Set the 5294 Control Unit Test/Normal switch to Normal.

3. Set the 5294 Control Unit Power switch to On.

4. Ask the host system operator to vary on the 5294 Control Unit and to provide you with the parameters that are required for this application.
   a. Logical link protocol (QLLC, ELLC, or PSH) valid characters are either [Q] or E100 through E999 [E| | | ]).
   The PSH protocol does not require operator input.
   b. Logical channel identification (valid characters are 3 hexadecimal values--0 through 9, A through F [L| | | ]).
   c. Packet size (valid value is 064, 128, or 256 [P| | | ]).
   d. Packet window size (valid values are 02 through 07 [W| | ]).

***Frame 2.10 Continued***

This procedure is for an X.25 Open command.

- An Open command can establish only a permanent virtual circuit.
- Manual options are allowed.
- Flow control options are allowed.

5. Fill in the blanks on the Applications Setup Form with the information obtained from the host system operator; follow the instructions on the form.

**APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION**

Setup instructions for the following applications:

____________________________________

____________________________________

____________________________________

Host Contact __________________________ Telephone __________

**A** Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

**B** Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

**C** Enter the following as one line:

| O | , | | | | | , | L | | | | , | P | | | | , | W | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**D** Press Enter.

6. Go to frame **2.22**.

Extra copies of the Applications Setup Form are provided in Appendix B.

Refer to *Entering X.25 Commands* for rules and examples.

**2.11**

Look at position 4 of entry field 5 -> on the setup form (screen).

```
1->          2->          4->          5-> xxx?xxx       6->
```

**Is there a 0 (zero) in position 4 of field 5 ->?**

**YES** → **2.12**

**NO** → **2.13**

YES answer: Manual options are not allowed.

NO answer: Manual options are allowed.

This page is intentionally left blank.

2.12

**Do the following:**

**Note:** You may skip steps 1, 2, and 3 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Set the 5294 Control Unit Power switch to Off.
2. Set the 5294 Control Unit Test/Normal switch to Normal.
3. Set the 5294 Control Unit Power switch to On.
4. Ask the host system operator to vary on the 5294 Control Unit and to provide you with the parameters that are required for this application.
   a. Host network address (the characters must be numeric, and the length 1 through 15 |N| | | | | | | | | | | | | | | |).
   b. Password (the characters must be alphameric, and the length 1 through 8 |X| | | | | | | | |).

*Frame 2.12 Continued*

This procedure is for an X.25 Answer command.

- The circuit type is switched virtual (SVC).
- Manual options are not allowed.
- Flow control options are not allowed.

5. Fill in the blanks on the Applications Setup Form with the information obtained from the host system operator; follow the instructions on the form.

**APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION**

Setup instructions for the following applications:

________________________________

________________________________

________________________________

Host Contact ________________________ Telephone __________

**A** Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

**B** Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

**C** Enter the following as one line:

| A | , | N | | | | | | | | | | | | | | , | X | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**D** Press Enter.

6. Go to frame **2.22**.

Extra copies of the Applications Setup Form are provided in Appendix B.

Refer to *Entering X.25 Commands* for rules and examples.

**2.13**

Look at position 3 of entry field 5 -> on the setup form (screen).

```
1->          2->          4->          5-> xx?xxxx          6->
```

**Is there a 0 (zero) in position 3 of field 5 ->?**

**YES** → **2.14**

**NO** → **2.15**

YES answer: Flow control options are not allowed.

NO answer: Flow control options are allowed.

This page is intentionally left blank.

2.14

**Do the following:**

**Note:** You may skip steps 1, 2, and 3 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Set the 5294 Control Unit Power switch to Off.

2. Set the 5294 Control Unit Test/Normal switch to Normal.

3. Set the 5294 Control Unit Power switch to On.

4. Ask the host system operator to vary on the 5294 Control Unit and to provide you with the parameters that are required for this application.
   a. Host network address (the characters must be numeric, and the length 1 through 15 [N| | | | | | | | | | | | | | ]).
   b. Password (the characters must be alphameric, and the length 1 through 8 [X| | | | | | | ]).
   c. Logical link protocol, ELLC (valid characters are E100 through E999 [E| | | ]).

*Frame 2.14 Continued*

This procedure is for an X.25 Answer command.

- The circuit type is switched virtual (SVC).
- Manual options are allowed.
- Flow control options are not allowed.

5. Fill in the blanks on the Applications Setup Form with the information obtained from the host system operator; follow the instructions on the form.

**APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION**

Setup instructions for the following applications:

______________________________________

______________________________________

______________________________________

Host Contact __________________________ Telephone ____________

**A** Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

**B** Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

**C** Enter the following as one line:

A , N _ _ _ _ _ _ _ _ _ _ _ _ _ _ , X _ _ _ _ _ _
_ _ _ , E _ _ _

**D** Press Enter.

6. Go to frame **2.22**.

Extra copies of the Applications Setup Form are provided in Appendix B.

Refer to *Entering X.25 Commands* for rules and examples.

**2.15**

**Do the following:**

**Note:** You may skip steps 1, 2, and 3 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Set the 5294 Control Unit Power switch to Off.

2. Set the 5294 Control Unit Test/Normal switch to Normal.

3. Set the 5294 Control Unit Power switch to On.

4. Ask the host system operator to vary on the 5294 Control Unit and to provide you with the parameters that are required for this application.
   a. Host network address (the characters must be numeric, and the length 1 through 15 [N _ _ _ _ _ _ _ _ _ _ _ _ _ _ _]).
   b. Password (the characters must be alphameric, and the length 1 through 8 [X _ _ _ _ _ _ _ _]).
   c. Logical link protocol, ELLC (valid characters are E100 through E999 [E _ _ _]).
   d. Packet size (valid value is 064, 128, or 256 [P _ _ _]).
   e. Packet window size (valid values are 02 through 07 [W _ _]).

***Frame 2.15 Continued***

This procedure is for an X.25 Answer command.

- The circuit type is switched virtual (SVC).
- Manual options are allowed.
- Flow control options are allowed.

5. Fill in the blanks on the Applications Setup Form with the information obtained from the host system operator; follow the instructions on the form.

**APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION**

Setup instructions for the following applications:

________________________________________

________________________________________

________________________________________

Host Contact ____________________________ Telephone ____________

**A** Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

**B** Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

**C** Enter the following as one line:

| A | , N | | | | | | | | | | | | | | , X | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | , E | | | | , P | | | | , W | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

**D** Press Enter.

6. Go to frame **2.22**.

Extra copies of the Applications Setup Form are provided in Appendix B.

Refer to *Entering X.25 Commands* for rules and examples.

**2.16**

Look at position 4 of entry field 5 -> on the setup form (screen).

```
1->        2->        4->        5-> xxx?xxx        6->
```

**Is there a 0 (zero) in position 4 of field 5 ->?**

**YES** → **2.17**

**NO** → **2.18**

YES answer: Manual options are not allowed.

NO answer: Manual options are allowed.

This page is intentionally left blank.

**2.17**

## Do the following:

**Note:** You may skip steps 1, 2, and 3 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Set the 5294 Control Unit Power switch to Off.

2. Set the 5294 Control Unit Test/Normal switch to Normal.

3. Set the 5294 Control Unit Power switch to On.

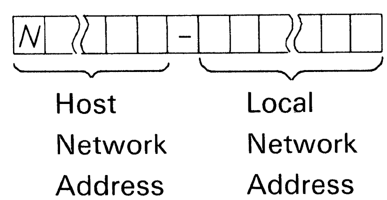
4. Ask the host system operator to vary on the 5294 Control Unit and to provide you with the parameters that are required for this application.
   a. Host network address (the characters must be numeric, and the length 1 through 15 [N              ]).
   b. Password (the characters must be alphameric, and the length 1 through 8 [X       ]).
   c. Logical channel identification (valid characters are 3 hexadecimal values--0 through 9, A through F [L   ]).

***Frame 2.17 Continued***

This procedure is for an X.25 Call command.

- The circuit type is switched virtual (SVC).
- Manual options are not allowed.
- Flow control options are not allowed.

If the network requires the address of the local site, a hyphen must be placed between the host network address and the local network address. For example,



5. Fill in the blanks on the Applications Setup Form with the information obtained from the host system operator; follow the instructions on the form.

**APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION**

Setup instructions for the following applications:

____________________________________

____________________________________

____________________________________

Host Contact __________________________ Telephone ____________

**A** Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

**B** Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

**C** Enter the following as one line:

C , N _ _ _ _ _ _ _ _ _ _ _ _ _ _ , X _ _ _ _ _ _
_ _ _ , L _ _ _

**D** Press Enter.

6. Go to frame 2.22.

Extra copies of the Applications Setup Form are provided in Appendix B.

**Refer to Entering X.25 Commands for rules and examples.**

**The host network address,**

N _ _ _ ... _ _ _ _

**must be supplied on a Call command.**

**2.18**

Look at position 3 of entry field 5 -> on the setup form (screen).

```
1->          2->          4->          5-> xx?xxxx      6->
```

**Is there a 0 (zero) in position 3 of field 5 ->?**

**YES** → **2.19**

**NO** → **2.20**

YES answer: Flow control options are not allowed.

NO answer: Flow control options are allowed.

This page is intentionally left blank.

**2.19**

**Do the following:**

**Note:** You may skip steps 1, 2, and 3 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Set the 5294 Control Unit Power switch to Off.

2. Set the 5294 Control Unit Test/Normal switch to Normal.

3. Set the 5294 Control Unit Power switch to On.

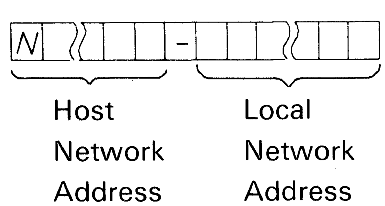
4. Ask the host system operator to vary on the 5294 Control Unit and to provide you with the parameters that are required for this application.
   a. Host network address (the characters must be numeric, and the length 1 through 15 [N□□□□□□□□□□□□□□]).
   b. Password (the characters must be alphameric, and the length 1 through 8 [X□□□□□□□]).
   c. Logical channel identification (valid characters are 3 hexadecimal values--0 through 9, A through F [L□□□]).
   d. Closed user group ID (valid characters are numeric [U□□]).
   e. Reverse charge (valid character is an [R]).
   f. Logical link control protocol (QLLC, ELLC, PSH) (valid characters are either [Q] or E100 through E999 [E□□□]). The PSH protocol does not require operator input.

***Frame 2.19 Continued***

This procedure is for an X.25 Call command.

- The circuit type is switched virtual (SVC).
- Manual options are allowed.
- Flow control options are not allowed.

If the network requires the address of the local site, a hyphen must be placed between the host network address and the local network address. For example,



g. Facility (valid character is an F ).

1) Throughput class (valid characters are 2 hexadecimal values--3 through 9, A through C 0 2 _ _ ).

2) Recognize private operating agency (RPOA) selection (valid characters are numeric 4 4 _ _ _ _ ).

5. Fill in the blanks on the Applications Setup Form with the information obtained from the host system operator; follow the instructions on the form.

**APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION**

Setup instructions for the following applications:

______________________________

______________________________

______________________________

Host Contact ______________________ Telephone __________

A Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

B Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

C Enter the following as one line:

C , N _ _ _ _ _ _ _ _ _ _ _ _ _ _ , X _ _ _ _ _ _
_ _ , L _ _ _ , U _ _ , R , _ _ _ _ , F 0 2 _ _ , F
4 4 _ _ _ _

D Press Enter.

6. Go to frame 2.22 .

Extra copies of the Applications Setup Form are provided in Appendix B.

**Refer to Entering X.25 Commands for rules and examples.**

**The host network address,**

N _ _ ≀ _ _ _ ,

**must be supplied on a Call command.**

**2.20**

**Do the following:**

**Note:** You may skip steps 1, 2, and 3 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Set the 5294 Control Unit Power switch to Off.
2. Set the 5294 Control Unit Test/Normal switch to Normal.
3. Set the 5294 Control Unit Power switch to On.
4. Ask the host system operator to vary on the 5294 Control Unit and to provide you with the parameters that are required for this application.
   a. Host network address (the characters must be numeric, and the length 1 through 15 [N| | | | | | | | | | | | | | | ]).
   b. Password (the characters must be alphameric, and the length 1 through 8 [X| | | | | | | | ]).
   c. Logical channel identification (valid characters are 3 hexadecimal values--0 through 9, A through F [L| | | ]).
   d. Closed user group ID (valid characters are numeric [U| | ]).
   e. Reverse charge (valid character is an [R]).
   f. Logical link control protocol (QLLC, ELLC, PSH) (valid characters are either [Q] or E100 through E999 [E| | | ]). The PSH protocol does not require operator input.

*Frame 2.20 Continued*

This procedure is for an X.25 Call command.

- The circuit type is switched virtual (SVC).
- Manual options are allowed.
- Flow control options are allowed.

If the network requires the address of the local site, a hyphen must be placed between the host network address and the local network address. For example,

[N| ≀ | | | - | | | ≀ | | ]

Host Network Address — Local Network Address

g. Facility (valid character is an [F]).

1) Throughput class (valid characters are 2 hexadecimal values--3 through 9, A through C [0|2| | ]).

2) Recognize private operating agency (RPOA) selection (valid characters are numeric [4|4| | | | ]).

h. Packet size (valid value is 064, 128, or 256 [P| | | ]).

i. Packet window size (valid values are 02 through 07 [W| | ]).

5. Fill in the blanks on the Applications Setup Form with the information obtained from the host system operator; follow the instructions on the form.

**APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION**

Setup instructions for the following applications:

________________________________

________________________________

________________________________

Host Contact ________________________ Telephone ____________

**A** Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

**B** Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

**C** Enter the following as one line:

[C] , [N| | | | | | | | | | | | | | | ] , [X| | | | | | ]
[ | | ] , [L| | | ] , [U| | ] , [R] , [ | | | | ] , [F|0|2| | ] , [F]
[4|4| | | | ] , [P| | | ] , [W| | ]

**D** Press Enter.

6. Go to frame **2.22**.

Extra copies of the Applications Setup Form are provided in Appendix B.

**Refer to Entering X.25 Commands for rules and examples.**

**The host network address,**

[N| | |} | | | ]

**must be supplied on a Call command.**

2.21

**To enter a Detach command, do the following:**

1. Press Error Reset on the typewriter-like keyboard or press a Reset key on the data entry keyboard.
2. Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.
   or
   Press Reset key.
   Press and hold the Alt key, and press the Sys Rq key.
   Release the Alt key.
3. Enter a [D].
4. Press the Enter key.

The 5294 Control Unit disconnects from the network.

One of the uses of the Detach command is to terminate an Answer command that has been presented to the network, but remains unanswered.

**2.22**

When the sign-on screen appears on your display station in approximately 2 minutes, the communications procedure is complete.

If the sign-on screen does not appear, do the following:

1. If a system reference code is displayed (blinking) on your display station, go to Chapter 3. Problem Analysis and Resolution.

2. Contact the host system operator and ensure that the 5294 Control Unit is varied on, then go back to frame **2.1** and repeat the procedure.

3. If the sign-on screen still does not appear, go to Chapter 3. Problem Analysis and Resolution.

**2.23**

If you have a completed Applications Setup Form, follow the instructions on the form, then go to **2.29**.

If you do not have a completed Applications Setup Form, go to the indicated frame for the procedure you want to enter.

| Establish Communcations (subscription parameters are correct) | Establish Communcations (change subscription parameters) | Detach |
|---|---|---|
| 2.24 | 2.30 | 2.31 |

**2.24**

**Are you placing a call from the 5294 Control Unit?**

| YES | NO |
|---|---|
| 2.26 | 2.25 |

YES answer: Control unit is in call mode.

NO answer: Control unit is in answer mode.

2.25

**Do the following:**

**Note:** You may skip steps 1, 2, 3, and 4 if you are sure that the 5294 Control Unit Test/Normal switch was in the Normal position when the 5294 Control Unit Power switch was set to On, and these switches were not changed.

1. Ensure that the display stations and printers are powered on.
2. Set the 5294 Control Unit Power switch to Off.
3. Set the 5294 Control Unit Test/Normal switch to Normal.
4. Set the 5294 Control Unit Power switch to On.
5. In approximately 2 minutes, the sign-on screen should be displayed.
6. If the sign-on screen does not appear, call the host system operator and have the 5294 Control Unit varied on.
7. If the sign-on screen still does not appear, go to Chapter 3. Problem Analysis and Resolution.

**2.26** **Is your network subscription set up for direct call?**

YES → 2.27

NO → 2.28

**2.27** **Do the following.**

1. Press the Reset key.
2. Press and hold the Upper Shift key, and press the Sys Req/Attn key.
   or
   Press and hold the Alt key, and press the Sys Rq key. Release the Alt key.
3. Press Enter.
4. Go to frame 2.30.

YES answer: You do not have to enter the network address for the host system.

NO answer: You have to enter the network address for the host system.

If you are not sure whether your network subscription is set up for direct call, contact the host system operator.

**2.28**

**Do the following.**

1. Press the Reset key.
2. Press and hold the Upper Shift key, and press the Sys Req/Attn key.
   or
   Press Reset key.
   Press and hold the Alt key, and press the Sys Rq key.
   Release the Alt key.
3. Enter the network address.
4. Press Enter.
5. Go to frame **2.30**.

**2.29**

**Do the following.**

1. Press the Reset key.
2. Press and hold the Upper Shift key, and press the Sys Req/Attn key.
   or
   Press and hold the Alt key, and press the Sys Rq key.
   Release the Alt key.
3. Enter the facility registration for the parameter to be changed (supplied by the host system operator).
4. Press Enter.
5. Go to frame **2.30**.

**2.30**

When the sign-on screen appears on your display station in approximately 2 minutes, the communications procedure is complete.

If the sign-on screen does not appear, do the following:

1. If a system reference code is displayed (blinking) onyour display station, go to Chapter 3. Problem Analysis and Resolution.
2. Contact the host system operator and ensure that the 5294 Control Unit is varied on, then go back to frame **2.1** and repeat the procedure.
3. If the sign-on screen still does not appear, go to Chapter 3. Problem Analysis and Resolution.

**2.31**

**To enter a Detach command, do the following:**

1. Press Error Reset on the typewriter-like keyboard or press a Reset key on the data entry keyboard.
2. Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.
   or
   Press and hold the Alt key, and press the Sys Rq key. Release the Alt key.
3. Enter a *D*.
4. Press the Enter key.

The 5294 Control Unit disconnects from the network.

The Detach command is used to recover from an error (even though no error code may appear). Use the Detach command if you attempted to establish communications and the sign-on screen did not appear in two minutes.

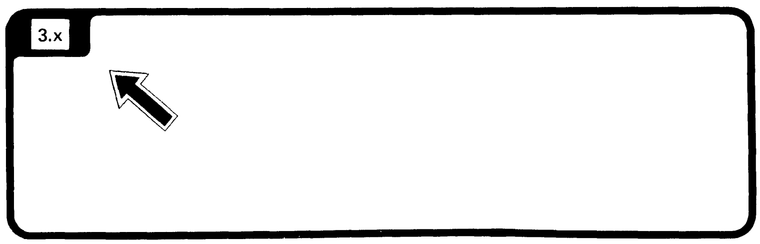
**Note:** The Detach command is *not* used to sign off from the host system.

# Chapter 3. Problem Analysis and Resolution

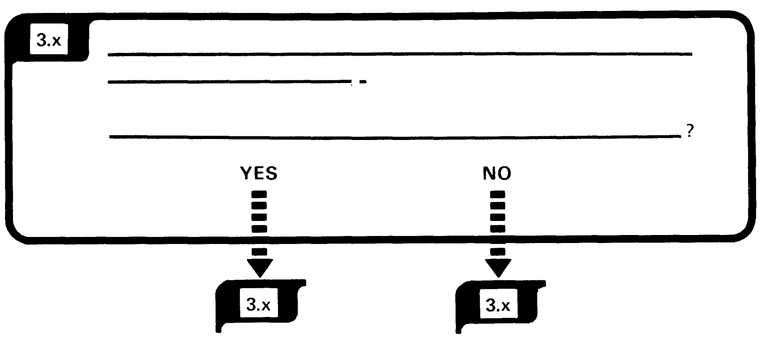
## Solving Problems

READ CAREFULLY: This information will aid you in solving your problem if you follow every instruction and accurately answer each question.

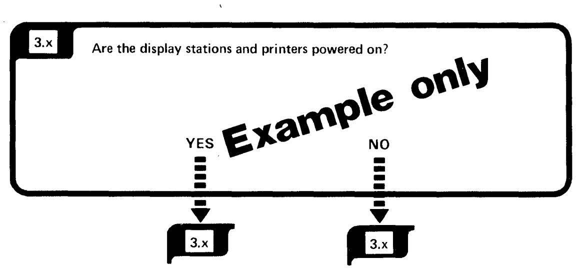
The instructions and questions are contained in frames, and each frame is identified by a number in the upper-left corner.




FOLLOW THE SEQUENCE: Always answer one question at a time. When instructions precede the question, follow the instructions exactly in the order given before you answer the question.




The text and illustrations shown to the right of a frame are additional information you might need to answer the question in the frame. Always read the instructions in the frame first, and then the additional information.




Sometimes this manual will use the words <u>work station</u>. Work station means either a printer or a work station.

**Note:** Depending on how you answer the question, you might not always go to the next sequential frame.

A symbol that appears in the text like **3.x** means go to that frame.

A broken arrow like ▮▮▮▮▮▮▶ is used to show action such as push, pull, turn, go to, and continuation of a frame.

To continue, go to **3.1** .

**3.1**

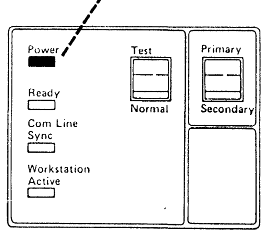
**Is there an SRC (system reference code) displayed on your display screen?**

**YES** → **3.29**

**NO** → **3.2**

**3.2**

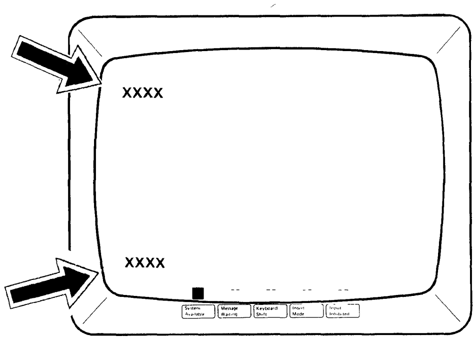
**Is the 5294 Control Unit Power indicator on?**



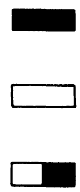

**YES** → Go to **3.7**

**NO** → **3.3**

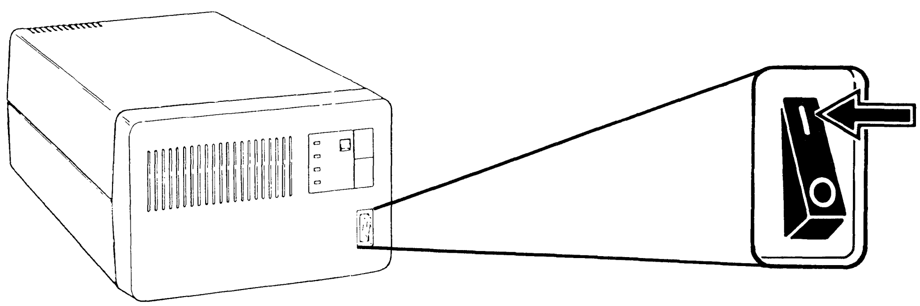
A system reference code (SRC), can be 4 or 6 alphameric characters. These characters will be blinking and be located either in the upper left corner or the lower left corner of the display screen.




LEGEND:




**3.3** Is the 5294 Control Unit Power switch in the On position?



YES → **3.4**

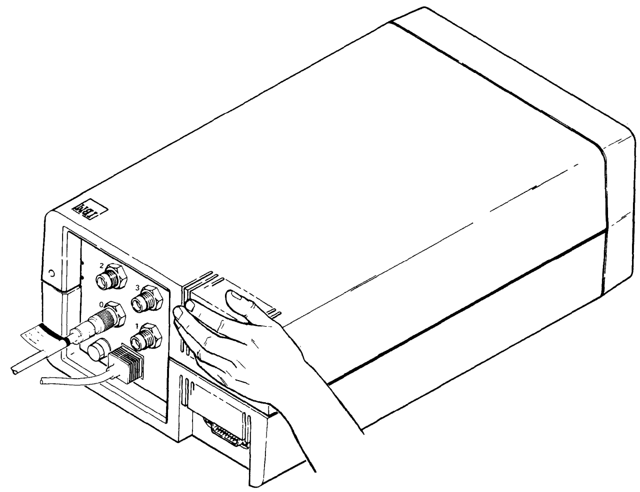
NO → Set the 5294 Control Unit Power switch to On and establish normal operation; if unsuccessful,

go to **3.1**.

**3.4**

**Is the fan in the 5294 Control Unit rear panel running?**

To determine, place your hand over the area on the back panel where the fan is located. If you can feel air movement, the fan is running.



YES

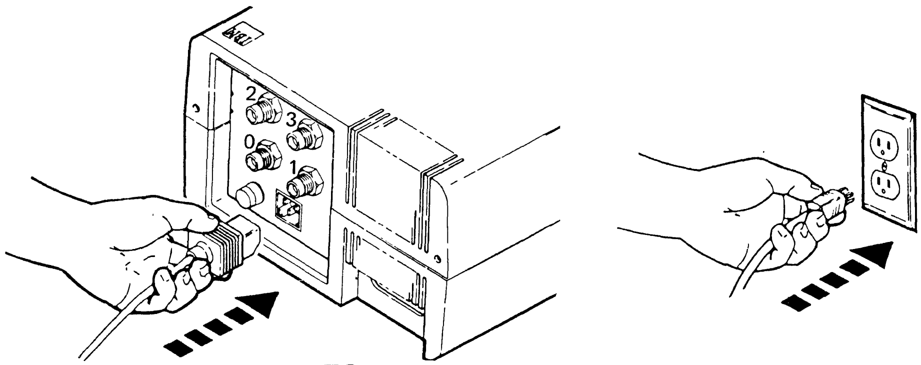
Contact your 5294 Control Unit service representative and report system reference code D10002.

**End of procedure.**

NO

3.5

**3.5** Is the power cable properly connected to the 5294 Control Unit and the power outlet?




YES → **3.6**

NO

Turn Power switch off.

Connect the power cable and establish normal operation.

If unsuccessful, go to **3.1**.

**3.6**

**Is there voltage at the power outlet?**

**Hint:** You can determine this by plugging the power cord of some other device, such as a lamp or typewriter, into this outlet.

**YES** — Contact your 5294 Control Unit service representative and report system reference code D10001.

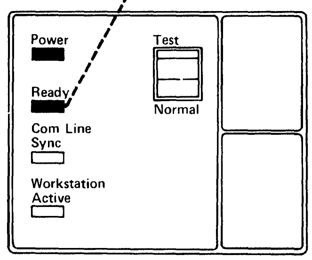
**End of procedure.**

**NO** — Contact your maintenance personnel to correct this condition.

**End of procedure.**

**3.7**

**Is the 5294 Control Unit Ready indicator on?**




**YES** → **3.8**

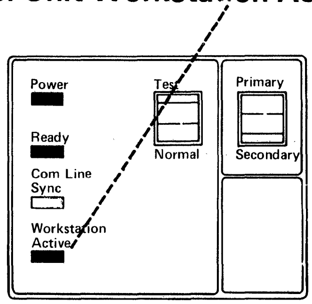
**NO**

Contact your 5294 Control Unit service representative and report system reference code D11001 if the Work Station Active indicator is off. Report system reference code D13003 if the Work Station Active indicator is on.

**End of procedure.**

3.8

**Is the 5294 Control Unit Workstation Active indicator on?**



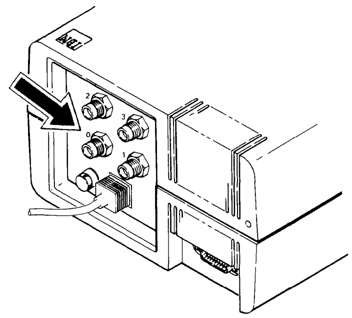

YES → 3.10

NO → 3.9

3.9

Look at the back of the 5294 Control Unit and count the number of twinaxial cables connected to the 5294 Control Unit.

**Is there only 1 twinaxial cable connected?**



YES

Go to 3.11

NO

Ensure that all attached work stations are powered on. If all work stations are on, contact your 5294 Control Unit service representative and report system reference code D13002.

If some work stations are powered off, power them on and go to frame 3.8.

**End of procedure.**

**3.10**

**Is the System Available indicator on at the failing display station or printer?**

If the failing work station is a printer, answer NO if the System Available indicator is off or the status indicators show that Line Sync or System Available is Off.

YES → **3.16**

NO → **3.11**

## 3.11

Set the Power switch on any failing display station or printer to Off; wait 5 seconds, and then set the Power switch to On.

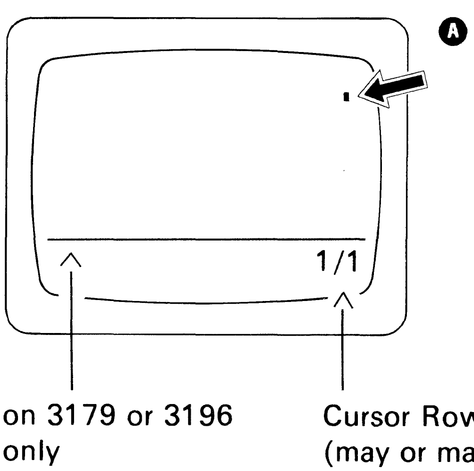
Wait 10 seconds, and then observe the display screen or the indicators on the printer.

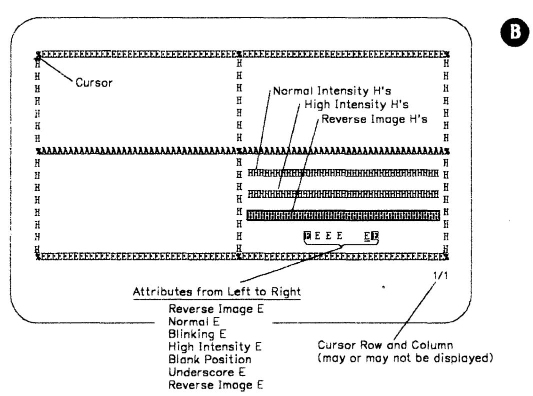
Answer only the question that applies to the type of work station that you just powered on.

- For all display stations except the 3180 Model 2, see **A**. Does the cursor remain in the upper right corner of the display screen?
- For a 3180 Model 2 display station see **B**. Does the display remain on the display screen?
- For a printer or other type of work station, do the indicators show that power on was successfully completed (refer to the appropriate work station Operator's Guide for the indicators)?

**YES** → 3.13

**NO** → 3.12



**3.12**

Check that any interconnecting cables between units of the failing display station or printer (such as keyboard cables) are correctly and securely connected.

If no problem is found with the cables, use the display station or printer problem determination procedures to isolate the failure.

**End of procedure.**

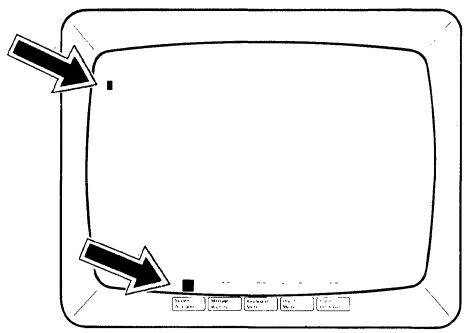
**3.13**

**Do the following:**

**Note:** Ensure that all jobs on other display stations and printers are terminated before the 5294 Control Unit Power switch is set to Off.

1. Set the Power switch on the 5294 Control Unit to Off.
2. Set the Test/Normal switch on the 5294 Control Unit to Test.
3. Set the Power switch on the 5294 Control Unit to On.
4. Wait 15 seconds.
5. Observe the display on the screen of the failing display station.

**Is the cursor in the upper left corner and is the System Available indicator on?**



**YES** → 3.15

**NO** → 3.14

**3.14**

**Do the following:**

1. Set the 5294 Control Unit Power switch to Off.

2. Set the 5294 Control Unit Test/Normal switch to Normal.

3. Check the address of the failing display station by:
   a. Referring to the 5294 Control Unit Setup Form for the correct address.
   b. Referring to the procedure for checking the address in the failing display station Setup Procedure or Operator's Guide.

4. Check the twinaxial cable(s) that connect the failing work station to the port on the 5294 Control Unit.
   a. Is each cable connector seated and tight? Make sure that you check the cable connector on each end of the cable.
   b. Visually check each cable for damage.

5. Set the 5294 Control Unit Power switch to On.

If you fixed the problem, establish normal operation on the previously failing display station.

If you did not fix the problem, contact the display station service representative.

**End of procedure.**

Each display station or printer cabled to the same port must have its own unique address. Refer to the 5294 Control Unit Setup Form to determine the correct address of the display station or the printer.

3.15

**Do the following:**

1. Obtain the 5294 Control Unit Setup Form.
2. Ensure that all attached display stations and printers are powered on.
3. At any display station, press the Command [Cmd] key, then press the Character Backspace [←] key.

   If the display station is a 3179 Model 2, a 3180 Model 2, or a 3196, press and hold the Alt key; then press the Test key.
4. Observe the setup screen and compare the display to the setup form.

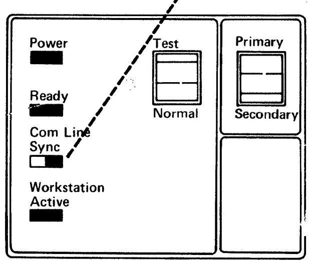
**Does the display match the setup form?**

**YES** → 3.27

**NO** → 3.28

**3.16**

**Is the 5294 Control Unit Com Line Sync indicator blinking?**




**YES** → **3.17**

**NO** → **3.20**

**3.17** **Is a printer the only failing work station?**

YES: continue below.

NO: go to **3.18**

Visually check the connecting twinaxial cables for damage.

Check that the cable connectors are seated and tight for all twinaxial cables that connect the printer to the port.

If the cause of the problem cannot be found, contact the printer service representative.

**End of procedure.**

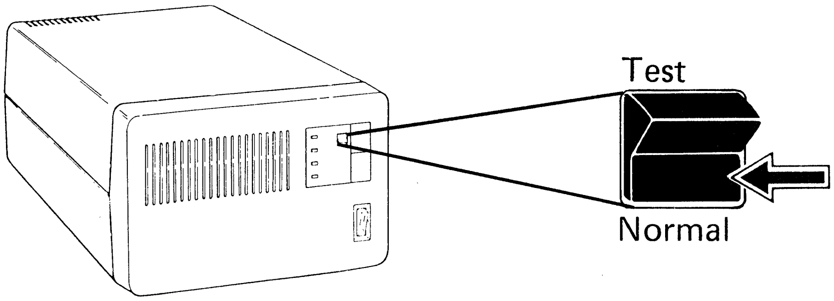
**3.18** **Is a sign-on screen or a job screen displayed on the failing display station?**

YES: go to **3.23**

NO: go to **3.19**

**3.19**

**Is the 5294 Control Unit Test/Normal switch in the Normal position?**




**YES** → **3.20**

**NO** →

Set the 5294 Control Unit Power switch to Off. Set the 5294 Control Unit Test/Normal switch to Normal. Set the 5294 Control Unit switch to On.

Establish normal operation; if unsuccessful, go to **3.1**.

**3.20**

Contact the host system operator and ask if your 5294 Control Unit was varied on.

If your 5294 Control Unit was not varied on, have the host system operator vary on your 5294 Control Unit and retry the job.

If the host system operator has already varied on your 5294 Control Unit, have the host system operator vary on your 5294 Control Unit again.

Wait 30 seconds.

**Is the sign-on screen displayed on your display station?**

**YES** → 3.22

**NO** → 3.21

This is what you normally do to get a sign-on screen.

**3.21**

**Have you tried to establish communications with the host system?**

**YES**

Go to Appendix A and run the extended test routine.

**NO**

Go to Chapter 2 and follow the procedure to establish communications with the host system.

**3.22**

**Can you sign on to the host system?**

**YES**

Call the host system operator and report that an intermittent failure occurred and the failure was external to the 5294 Control Unit and attached work stations.

**End of procedure.**

**NO**

Call the host system programmer and report that you cannot sign on.

**End of procedure.**

**3.23**

**Is the problem related to the character(s) displayed on your screen not matching the keys you pressed on your keyboard?**

**YES** — Check the configuration for your display station. Is the keyboard code correct for the keyboard on your display station? If the configuration is correct, contact the 5294 Control Unit service representative.

**End of procedure.**

**NO** — 3.24

**3.24**

**Is the problem related to a magnetic stripe reader or a selector light pen?**

**YES** — Obtain the appropriate work station *Operator's Guide* and refer to the *Problem Determination Procedures.*

**NO** — 3.25

**3.25**

**Is the problem related to a self-check or a copy-to-print operation?**

**YES** — Contact the host system operator and report the problem.

**NO** — Go to 3.26.

**3.26**

**Do only certain jobs fail?**

**YES** — Report the failing jobs to the host system operator.

**End of procedure.**

**NO** — The cause of the failure has not been identified. If a problem still exists, contact your 5294 Control Unit service representative.

**End of procedure.**

3.27

**Do the following:**

1. Press the Enter key two times.

2. Press the Reset key.

3. Set the 5294 Control Unit Power switch to Off.

4. Set the 5294 Control Unit Test/Normal switch to Normal.

5. Set the 5294 Control Unit Power switch to On.

6. Resume normal operation.

**End of procedure.**

**3.28**

**Do the following:**

1. Set the 5294 Control Unit Power switch to Off.

2. Set the 5294 Control Unit Test/Normal switch to Normal.

3. Obtain the appropriate manual (for example, the Operator's Guide or the Setup Procedure) for the failing display station or printer.

4. Check that the address is correctly set. (The correct address is the one shown on the 5294 Control Unit Setup Form, but not displayed on the setup screen.)

5. If the address is not correctly set:
   a. Enter/set the correct address as instructed by the appropriate manual.
   b. Ensure that the failing display station or printer is powered on.
   c. Set the 5294 Control Unit Power switch to On.
   d. Resume normal operation.

6. If the address is correctly set:
   a. Set the 5294 Control Unit Power switch to On.
   b. Resume normal operation at the nonfailing display stations and printers.
   c. Contact the service representative for the failing display station or printer.

**3.29**

**Do the following:**

1. Write down the system reference code that is displayed on your display station.

2. Go to the following table and in the leftmost column determine the range of codes that contains the displayed code. For example, SRC 0026 is contained within the 0000 through 003x range. Notice that each range of codes is in ascending sequence.

3. Follow the appropriate row from left to right and note the general information about the SRC.

4. Respond to the instructions in the rightmost column for the appropriate row.

| System Reference Code (SRC) | Reason for System Reference Code | SRC Is Displayed on These Screens | Response to System Reference Code (See Note 1) |
|---|---|---|---|
| **0000 through 003x** | An operator error occurred during a key entry operation. | Where the error originated. | Go to "Keyboard-Entry Error Codes." Locate the error code and follow the instruction. |
| **0040 through 005x** | An error occurred on the communications network during the time the 5294 Control Unit was communicating with the host system. | All active display stations. | Go to "Communications Network Error Codes." Locate the error code and follow the instructions. |
| **0060 through 006x (DBCS)** | An error occurred that is related to the Double-Byte Character Support function. | Where the error originated. | Refer to the *IBM Multistation 5550-5250 Personal Computer User's Guide*. |
| **0070 through 007x** | An operator error occurred while using the Text Processing feature. | Where the error originated. | Go to "Keyboard-Entry Error Codes (Text Processing Only)." Locate the error code and follow the instructions. |
| **0080 through 008x** | An error occurred during the 5294 Control Unit setup procedure. | Only on the display station being used for the setup procedure. | These error codes occur only during the customer setup procedure; refer to the *5294 Control Unit Setup Procedure Manual*, locate the error code, and respond to the instructions. |
| **0090 through 009x** | A display station operator caused an error that affects the host system. | Where the error originated. | Go to "System Support Error Codes." Locate the error code and follow the instructions. |
| **10xxxx** | A display station operator attempted to enter an incorrect or invalid X.25 command or parameter from the keyboard. | Where the error originated. | Go to "Keyboard-Entered Options Error Codes (X.25 Only)." Locate the error code and follow the instructions. |
| **11xxxx through 1Fxxxx** | An error was detected by the DTE or DCE on an X.25 network. | All active display stations. | Go to "Communications Network Error Codes (X.25 Only)." Locate the error code and follow the instructions. |
| **20xxxx** | A display station operator attempted to enter an incorrect or invalid X.21 command or parameter from the keyboard. | Where the error originated. | Go to "Keyboard-Entered Options Error Codes (X.21 Switched Only)." Locate the error code and follow the instructions. |
| **21xxxx through 2Fxxxx** | An error was detected by the DTE or DCE on an X.21 switched network. | All active display stations. | Go to "Communications Network Error Codes (X.21 Switched Only)." Locate the error code and follow the instructions. |
| **61xxxx through 6Fxxxx** | These system reference codes are displayed only during 5294 Control Unit service procedures. | Only on the display station being used for the service procedures. | SRC is not displayed when the Test/Normal switch is in the Normal position. |

| System Reference Code (SRC) | Reason for System Reference Code | SRC Is Displayed on These Screens | Response to System Reference Code (See Note 1) |
|---|---|---|---|
| **D0xxxx through DFxxxx** | An error occurred during the 5294 Control Unit power-on sequence. | All active display stations. See Note 2. | Record the SRC. Set the 5294 Control Unit Power switch to OFF and then to ON. If the error occurs again, contact your 5294 Control Unit service representative and report the SRC. |
| **E0xxxx** | An internal error occurred in the 5294 Control Unit. | All active display stations. See Note 2. | Record the SRC. Set the 5294 Control Unit Power switch to OFF and then to ON. If the error occurs again, contact your 5294 Control Unit service representative and report the SRC. |
| **F0xxxx through FFxxxx** | An internal error occurred in the 5294 Control Unit. | All active display stations. See Note 2. | Record the SRC. Contact the 5294 Control Unit service representative and report the SRC. |

**Notes:**

1. The system reference code (SRC) may not be displayed until the Enter key is pressed.
2. Certain types of errors can prevent the system reference code (SRC) from being displayed on all active display stations.

## Keyboard-Entry Error Codes

If a typing error occurs while you are entering information, the keyboard locks, which prevents further use of the keyboard. A blinking cursor indicates the location of the error and a 4-digit error code is displayed. The location of the displayed error code is determined by the host system program, but usually it is displayed on the last line of the screen.

After sign-on is complete, you can press the Help key and a message is displayed that describes the error. Then press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard to recover from the error. The cursor remains at its current position unless otherwise noted.

The error codes, their meanings, and recovery procedures are as follows:

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0000** | You pressed the Help key; however, either no error code was displayed or the error was issued by a program that does not support the Help key.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Then continue entering information or refer to the meaning for the previous error code displayed and do the recovery procedure listed. |
| **0001** | The 5294 Control Unit has not kept up with the rate you were entering information and the last character you entered was not recognized.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and continue entering information. |
| **0002** | The 5294 Control Unit received a key code that is not valid and does not know which key you pressed.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and try to continue entering the data. If the error cannot be reset or still occurs, contact the display station service representative and report the problem. |
| **0003** | You pressed the Cmd key, but the next key you pressed was not one of the command function keys; or you pressed the Alt key and a key with no Alt function.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and continue, using the correct keys. |
| **0004** | You tried to enter data from the keyboard into a field where only an entry from a Magnetic Stripe Reader or a Selector Light Pen is allowed.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard, or a Reset key on the data entry keyboard, and move the cursor to a field where data from the keyboard can be entered, or use the Magnetic Stripe Reader or the Selector Light Pen, as appropriate. |
| **0005** | You have attempted to enter data; however, the cursor is not in an input field on the display. Data cannot be entered in a protected area of the display.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and move the cursor to a valid input field. |
| **0006** | You pressed the Sys Req/Attn key while establishing an X.25 circuit, or you pressed an invalid key after pressing the Sys Req/Attn key and before pressing the Enter/Rec Adv key or the Error Reset key on the typewriter-like keyboard, or the Enter/Rec Adv key or a Reset key on the data entry keyboard.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard, wait for the sign-on screen to appear, and use a valid key sequence. |
| **0007** | There is at least one mandatory entry field on the screen that you must enter data into before the screen can be changed or processed. (The cursor goes to the first character position of the first unentered mandatory entry field.)<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and enter the required data. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0008** | You tried to enter data into a field that will accept only alphabetic data, and you pressed a nonalphabetic key. Valid characters are A through Z, blank, comma, period, and hyphen.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and continue, using valid characters. |
| **0009** | You tried to enter data into a field that will accept only numeric data, and you pressed a non-numeric key. Valid characters are 0 through 9, blank, comma, period, plus, and minus.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and continue, using valid characters. |
| **0010** | You tried to enter data into a field that will accept only signed numeric data, and you pressed another key. Valid characters are 0 through 9.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and continue, using valid characters. |
| **0011** | You attempted to enter data into the last position of a signed numeric field.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Make sure that the data is correct, and exit the field by using the Field -, Field +, or Field Exit key. |
| **0012** | There is no room to insert data into this field. Either there is no more room in the field, or the cursor is in the last position of the field.<br><br>Do not use insert mode to change data or to enter the last character into this field.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Then, correct the field, if necessary, and continue. |
| **0013** | You attempted to exit a field while the display station was still in the insert mode.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and exit the field normally. |
| **0014** | You pressed a function key that would move the cursor out of this field; however, the requirements of this mandatory-fill field were not met. A mandatory-fill field must be completely filled or left blank.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Then enter data to fill the entire field, or move the cursor to the start of the field, and use the Field -, Field +, or Field Exit key to blank all of the field. |
| **0015** | You entered data into a self-check field and the number you entered and the check digit do not compare.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Check that you have correctly entered the number and check digit. If you entered them correctly, check that the number is valid for a self-check field. If the numbers you are using are valid but this error still occurs, contact the display station service representative and report the problem. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0016** | You pressed the Field - key, but the field you are in is not a signed numeric field or (for some systems) a numeric-only field.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. You can now continue to enter data, or press the Field Exit key to exit the field. |
| **0017** | You pressed the Field -, Field +, or Field Exit key; however, the requirements for this mandatory-fill field were not met. A mandatory-fill field must be completely filled unless you exit it from the first position of the field.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Then enter data to the end of the field, or move the cursor to the start of the field and use the Field -, Field +, or Field Exit key to blank all of the field. |
| **0018** | You must use a nondata key, for example, the Field Exit key or a cursor movement key, to exit this field.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Then use a nondata key to exit this field. |
| **0019** | You pressed the Dup key; however, the Dup key is not permitted in this field.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Continue without using the Dup key in this field. |
| **0020** | You pressed a function control key; however, that key is not allowed in this field. This is either a right-adjust or a signed numeric field and you must exit the field before pressing the following function control keys: command function keys, Test Request key (Character Backspace), Clear key, Enter/Rec Adv key, Print key, Help key, Roll keys, and the Home key (when the cursor is in the home position).<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. The cursor is in the same position it was when you pressed the invalid key. Continue by pressing the Field -, Field +, or Field Exit key. |
| **0021** | The cursor is positioned in a mandatory entry field. A mandatory entry field must have data entered into before you can exit the field by pressing the Field -, Field +, or Field Exit key.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and enter the required data. |
| **0022** | A system error occurred. The status of the current field is not known. This error can occur during an insert or delete operation.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Check the display screen to determine if the insert or delete function was completed properly. If not completed properly, correct the field. |
| **0023** | You are in hexadecimal mode but the first key pressed was not a character A through F or 4 through 9, or the second key pressed was not a character A through F or 0 through 9.<br><br>This error also occurs when a hexadecimal code is used in a numeric-only, signed numeric, alpha-only, or I/O field.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Continue by pressing the correct keys. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0024** | You pressed a key that is not valid. Only characters 0 through 9 and the Dup key are allowed in this field.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard, and continue by entering digits in this field. |
| **0026** | You pressed the Field - key to exit a numeric-only field but the last position of the field was not a character 0 through 9.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Correct the last position of the field or exit the field by using a key other than the Field - key; for example, the Field + or Field Exit key. |
| **0027** | You pressed a key that is not valid for your display station.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and continue, using valid keys. |
| **0029** | The second key pressed during a diacritic key function did not result in a valid combination.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and enter a valid combination. |
| **0031** | The data received from the Magnetic Stripe Reader card was longer than the maximum allowed.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and use another Magnetic Stripe Reader card. |
| **0032** | The data from the Magnetic Stripe Reader was not received correctly.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard, and pass the card through the Magnetic Stripe Reader again. If the error is still present after several attempts, contact the display station service representative and report the problem. |
| **0033** | The Magnetic Stripe Reader data received was secured data (for example, an operator ID card), and this field was not specified for secured data.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard and continue using a correct Magnetic Stripe Reader card. |
| **0034** | The Magnetic Stripe Reader data received will not fit into the active input field.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Pass another card through the Magnetic Stripe Reader. If the error is still present, contact the host system operator and report a possible programming error. |
| **0035** | The card to be read was incorrectly inserted into the Magnetic Stripe Reader, was incorrectly made, or is damaged.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Then put the card to be read through the Magnetic Stripe Reader again. If the error is still present after several attempts, try other magnetic stripe cards or the test magnetic stripe card to make sure that the problem is not caused by a defective card. If the error is still present, contact the display station service representative and report the problem. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0036** | You attempted to use the Selector Light Pen while a field was active.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Then complete the current field or use the Field Exit or Field Backspace key to position the cursor for Selector Light Pen selection. |
| **0037** | You attempted to use the Selector Light Pen in a field that will not accept it.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard or a Reset key on the data entry keyboard. Then position the cursor to a field where the Selector Light Pen is valid. For more information, refer to the *Operator's Guide* associated with your display station. |
| **0038** | You attempted to use the Selector Light Pen or Magnetic Stripe Reader while using text processing. These functions are not valid for text processing.<br><br>To recover, press the Error Reset key on the typewriter-like keyboard. |

## Communications Network Error Codes

<table>
<tr><th>Error Code</th><th>Meaning and Recovery Procedure</th></tr>
<tr><td>0040</td><td>The 'data set ready' line became inactive during a receive operation.<br><br>If the 5294 Control Unit is attached to an X.25 network or an X.21 switched network, go to Step 2.<br><br>This error code can be caused by the configuration being incorrect, but if you are sure that the configuration is correct or has not changed, go to Step 2.<br><br>1. To verify the configuration:<br><br>a. Obtain the 5294 Control Unit Setup Form.<br>b. Display the setup screen by doing the following:<br>1) Set the 5294 Control Unit Power switch to Off.<br>2) Set the 5294 Control Unit Test/Normal switch to Test.<br>3) Set the 5294 Control Unit Power switch to On; wait 30 seconds.<br>4) Press the Command key and then the Character Backspace key. If the display station is a 3179 Model 2, a 3180 Model 2, or a 3196, press and hold the Alt key; then press the Test key.<br>c. Observe the setup screen and compare the value of the first (leftmost) position of entry field 3 to the value in the same position on the setup form.<br>d. If they match, go to Step 2; if they do not match, refer to the 5294 Control Unit Setup Procedure manual, perform the setup procedure, and retry the job.<br><br>2. Refer to Appendix A and run the extended test routine. If the extended test routine directs you to report this error, report one of the following:<br><br>a. If the 5294 Control Unit is connected to a modem, report to the modem service representative that the 'data set ready' line from the modem is inactive when it should be active.<br>b. If the 5294 Control Unit is connected to a digital network, report to the network service representative that either the network is out of service or no signals are being received from the DCE/Channel Service Unit.</td></tr>
<tr><td>0041</td><td>The 'received' line was idle for 15 contiguous bit-times. Refer to Appendix A and run the extended test routine. If the extended test routine directs you to report this error, report the following:<br><br>Contact the network service representative and report that the 'indicate' line or the 'received line signal detector' line is inactive when it should be active.</td></tr>
</table>

| **Error Code** | **Meaning and Recovery Procedure** |
|---|---|
| **0042** | A failure of the 'receive clock' signal occurred during a receive operation.<br><br>Refer to Appendix A and run the extended test routine. If the extended test routine directs you to report this error, report the following:<br><br>• If the communications type is EIA/CCITT or an X.21 signal converter, report to the modem/DCE service representative that 'receive clock' signals are not being received from the modem/DCE.<br><br>• If the communications type is DDSA, report error code 0042 to the 5294 Control Unit service representative.<br><br>If you are not sure which communications type is installed, refer to the IBM 5294 Control Unit Setup Form (Part 1). The communications type is listed under *5294 Control Unit Information.* |
| **0043** | The 'data set ready' line is active and it should be inactive.<br><br>If the 5294 Control Unit is attached to an X.25 network or an X.21 switched network and has the X.21 Switched Support feature, call the 5294 service representative.<br><br>This error code is valid only for switched networks (not X.25) when the communications type is EIA/CCITT.<br><br>If you are not sure which communications type is installed, refer to the IBM 5294 Control Unit Setup Form (Part 1). The communications type is listed under 5294 Control Unit Information.<br><br>This error code can be caused by the configuration being incorrect, but if you are sure that the configuration is correct or has not been changed, go to Step 2.<br><br>1. To verify the configuration, do the following:<br><br>a. Obtain the 5294 Control Unit Setup Form.<br>b. Display the setup screen.<br>1) Set the 5294 Control Unit Power switch to Off.<br>2) Set the 5294 Control Unit Test/Normal switch to Test.<br>3) Set the 5294 Control Unit Power switch to On; wait 30 seconds.<br>4) Press the Command key and then the Character Backspace key. If the display station is a 3179 Model 2, a 3180 Model 2, or a 3196, press and hold the Alt key; then press the Test key.<br>c. Observe the setup screen and compare the value of the first (leftmost) position of entry field 3 to the value in the same position on the setup form.<br>d. If they match, go to Step 2; if they do not match, refer to the *5294 Control Unit Setup Procedure* manual, perform the setup procedure, and retry the job.<br><br>2. Refer to Appendix A and run the extended test routine. If the extended test routine directs you to report this error, report the following:<br><br>Contact the modem/DCE service representative and report that the 'data set ready' line is active when it should be inactive. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0044** | The 30-second time-out ended with no valid data received. If the work station controller and the modem are set up for auto-answer operation, the 'data terminal ready' line becomes inactive and a line disconnect occurs.<br><br>If the 5294 Control Unit is attached to an X.25 network, call the 5294 service representative. If the 5294 Control Unit is attached to an X.21 switched network, and the communications type is an X.21 signal converter, go to Step 2.<br><br>If you are not sure which communications type is installed, refer to the IBM 5294 Control Unit Setup Form (Part 1). The communications type is listed under 5294 Control Unit Information.<br><br>This error code can be caused by the configuration being incorrect, but if you are sure that the configuration is correct or has not been changed, go to Step 2.<br><br>1. To verify the configuration, do the following:<br><br>a. Obtain the 5294 Control Unit Setup Form.<br>b. Display the setup screen.<br>1) Set the 5294 Control Unit Power switch to Off.<br>2) Set the 5294 Control Unit Test/Normal switch to Test.<br>3) Set the 5294 Control Unit Power switch to On; wait 30 seconds.<br>4) Press the Command key and then the Character Backspace key. If the display station is a 3179 Model 2, a 3180 Model 2, or a 3196, press and hold the Alt key; then press the Test key.<br>c. Observe the setup screen and compare the value of the first (leftmost) position of entry field 3 to the value in the same position on the setup form.<br>d. If they match, go to Step 2; if they do not match, refer to the *5294 Control Unit Setup Procedure* manual, perform the setup procedure, and retry the job.<br><br>2. Refer to Appendix A and run the Extended Test Routine. If the Extended Test Routine directs you to report this error, report the following:<br><br>Contact the host system operator and report that communication is being lost due to a receive time-out but the 5294 Control Unit is operating correctly. |
| **0045** | The network will not activate. Either a disconnect mode (DM) or a disconnect signal (DISC) was received during link setup procedures.<br><br>To restart communications, refer to "Chapter 2. Communications Procedures."<br><br>Retry the procedure. If this error code occurs again, contact the network representative and report the problem. |
| **0046** | The 5294 Control Unit received a reject in response to an HDLC frame previously sent.<br><br>To restart communications, refer to "Chapter 2. Communications Procedures."<br><br>Retry the job. If this error code occurs again, contact the 5294 Control Unit service representative and report the problem. |
| **0047** | The 5294 Control Unit received an unexpected disconnect mode (DM) or a disconnect (DISC) signal.<br><br>To restart communications, refer to "Chapter 2. Communications Procedures."<br><br>Retry the job. If this error code occurs again, contact the network representative and report the problem. |

<table>
<tr><th>Error Code</th><th>Meaning and Recovery Procedure</th></tr>
<tr><td>0048</td><td>The 5294 Control Unit received an unexpected unnumbered acknowledgment (UA). To restart communications, refer to "Chapter 2. Communications Procedures."<br><br>Retry the job. If this error code occurs again, contact the network representative and report the problem.</td></tr>
<tr><td>0050</td><td>Either the 'clear to send' line was inactive while the 'request to send' line was active, or the 'clear to send' line was active while the 'request to send' line was inactive.<br><br>If the 5294 Control Unit is attached to an X.25 network, go to Step 2. If the 5294 Control Unit is attached to an X.21 switched network and the communications type is an X.21 signal converter, call the 5294 service representative.<br><br>If you are not sure which communications type is installed, refer to the IBM 5294 Control Unit Setup Form (Part 1). The communications type is listed under 5294 Control Unit Information.<br><br>This error code can be caused by the configuration being incorrect, but if you are sure that the configuration is correct or has not been changed, go to Step 2.<br><br>1. To verify the configuration, do the following:<br><br>a. Obtain the 5294 Control Unit Setup Form.<br>b. Display the setup screen.<br>1) Set the 5294 Control Unit Power switch to Off.<br>2) Set the 5294 Control Unit Test/Normal switch to Test.<br>3) Set the 5294 Control Unit Power switch to On; wait 30 seconds.<br>4) Press the Command key and then the Character Backspace key. If the display station is a 3179 Model 2, a 3180 Model 2, or a 3196, press and hold the Alt key; then press the Test key.<br>c. Observe the setup screen and compare the values in positions 2 and 3 of entry field 3 to the values in the same positions on the setup form. (The leftmost bit is in position 1.)<br>d. If they match, go to Step 2; if they do not match, refer to the 5294 Control Unit Setup Procedure manual, perform the setup procedure, and retry the job.<br><br>2. Refer to Appendix A and run the extended test routine. If the extended test routine directs you to report this error, report the following:<br><br>Contact the modem/DCE service representative and report that the 'clear to send' signal received from the modem/DCE is not correctly responding to the 'request to send' signal sent from the 5294 Control Unit.</td></tr>
<tr><td>0051</td><td>The transmit clock failed during a transmit operation.<br><br>Refer to Appendix A and run the extended test routine. If the extended test routine directs you to report this error, report one of the following:<br><br>• If the communications type is EIA/CCITT or an X.21 signal converter, report to the modem/DCE service representative that the 'transmit clock' signal is not being received from the modem/DCE.<br><br>• If the communications type is DDSA, report error code 0051 to the 5294 Control Unit service representative.<br><br>If you are not sure which communications type is installed, refer to the IBM 5294 Control Unit Setup Form (Part 1). The communications type is listed under 5294 Control Unit Information.</td></tr>
</table>

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0052** | The transmit buffer failed to clear either before or during a transmit operation.<br><br>Contact the 5294 Control Unit service representative and report the problem. |
| **0053** | No acknowledgement of a transmission was received before the T1 timer expired after the 10th retry attempt.<br><br>Refer to Appendix A and run the extended test routine. If the extended test routine directs you to report this error, report the following:<br><br>Contact the network service representative and report that no acknowledgement of a transmission was received before the T1 timer expired after the 10th retry attempt. |
| **0054** | The received command was not valid for SDLC, X.25, or X.21 switched.<br><br>To restart communications, refer to "Chapter 2. Communications Procedures."<br><br>Retry the job. If this error code occurs again, contact the host system operator and report a possible programming error. |
| **0055** | The communications cable was unplugged and plugged back in, the DCE was powered off and powered back on, or the X.21 Switched Support feature (XLCA) detected an error.<br><br>Press the Error Reset key on the typewriter-like keyboard or the Reset key on the data entry keyboard and retry the operation. If the error recurs, contact the 5294 Control Unit service representative and report the error. |

## Keyboard-Entry Error Codes (Text Processing Only)

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0070** | An error occurred during the Word Spill function or the Carrier Return function.<br><br>To recover, press the Error Reset key. For more information, press the Help key. |
| **0071** | A Start Copy, Move, or Delete Text operation was attempted while one of the previous operations was already in progress.<br><br>To recover, press the Error Reset key. Try the operation again when the operation in progress is complete. |
| **0072** | The key pressed is not valid when the cursor is in the current position.<br><br>To recover, press the Error Reset key. Move the cursor to the correct position and try again. |
| **0073** | You attempted to delete or replace an Instruction or Format Change when the General Prompt function was not active.<br><br>To recover, press the Error Reset key. Press the General Prompt command key to delete or replace Instruction and Format Change characters. For more information, press the Help key. |
| **0074** | You pressed a key that is not valid when using the General Prompt function.<br><br>To recover, press the Error Reset key. |
| **0075** | The Find function failed to find the keyed characters.<br><br>To recover, press the Error Reset key. Try the operation again when the operation in progress is complete. |
| **0076** | The Insert function failed because the host system has not processed the text on the screen.<br><br>To recover, press the Error Reset key. Wait until the host system processes the text on the screen and try again. |
| **0077** | You pressed a function key that is not valid at this time.<br><br>To recover, press the Error Reset key. |
| **0078** | The required scale line is not defined for your display station.<br><br>There is an error in the application program. No scale line is defined for this line. |
| **0086** | You tried to use the Magnetic Stripe Reader, Selector Pen, Self-Check feature, Copy-to-Printer feature, or printing to an IPDS printer at your display station. The Expanded Function feature or Extended Function A feature that supports these devices is not installed in the 5294, or is not working correctly.<br><br>To recover, make sure the Expanded Function feature or Extended Function A feature for support of the IPDS printer was ordered and installed in the 5294. |

## System Support Error Codes

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0097** | A Test Request function is not supported by the host system. Contact the host system programmer and determine why the function is not supported. |
| **0099** | This error code can be caused by a communications problem, a display station or a printer not being varied on, or a configuration mismatch between the actual 5294 Control Unit cluster configuration and the system configuration record.<br><br>To resolve the cause of the error code, select the step that is appropriate for the current status of the display station(s) or printer(s).<br><br>1. If there is at least one display station with a sign-on screen displayed, contact the host system operator and determine if all display stations and printers attached to the 5294 Control Unit are varied on.<br><br>If all attached display stations and printers have been varied on, report to the host system operator that a mismatch may exist between the actual 5294 Control Unit cluster configuration and the system configuration record.<br><br>2. If no display stations have a sign-on screen displayed, go to frame 3.16 .<br><br>3. If there is only one display station attached to the 5294 Control Unit, contact the host system operator and have the display station varied on.<br><br>If the display station cannot be varied on, go to frame 3.16 . |

## Keyboard-Entered Options Error Codes (X.25 Only)

If the 5294 Control Unit has the X.25 Communications feature and an error occurs during the keyboard entry of commands, options, or parameters, a 6-digit error code of the form 10xxxx (where xxxx represents 4 hexadecimal digits) is displayed.

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **100000** | A previous Call command is in progress.<br><br>Wait until the previous Call command is complete, or an error code other than 100000 is displayed. |
| **100100** | The host system operator has not varied on the 5294 Control Unit, and a second command was attempted.<br><br>Either wait until the 5294 Control Unit is varied on, or enter a Detach command to terminate the communications link. The Detach command is described in Chapter 2. |
| **100200** | An Answer command was entered for a permanent virtual circuit (PVC).<br><br>A mismatch might exist between the entry fields on the 5294 Control Unit Setup Form and customer setup screen. If you are not sure, you should verify that the data on the 5294 Control Unit Setup Form matches the data on the customer setup screen (pay particular attention to position 2 of entry field 5).<br><br>If they match, press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100300** | A Call command was entered for a permanent virtual circuit (PVC).<br><br>A mismatch might exist between the entry fields on the 5294 Control Unit Setup Form and customer setup screen. If you are not sure, you should verify that the data on the 5294 Control Unit Setup Form matches the data on the customer setup screen (pay particular attention to position 2 of entry field 5).<br><br>If they match, press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100400** | The logical channel ID option is invalid because it is not 3 characters long.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100500** | The logical channel ID option is invalid because it is not an alphameric value.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **100600** | The password option is invalid because it is longer than 8 characters.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100700** | The host network address (TO network address) is invalid because it is greater than 15 decimal digits.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the address. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100800** | Your network address (FROM network address) is invalid because it is greater than 15 decimal digits.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the address. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100900** | The network address is invalid because it does not contain all numeric digits (0 through 9).<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the address. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100A00** | This error code is displayed because you attempted to enter a manual option from the keyboard, and the 5294 Control Unit is not configured to allow the option.<br><br>A mismatch might exist between the entry fields on the 5294 Control Unit Setup Form and the entry fields on the customer setup screen. If you are not sure, you should verify that the data on the 5294 Control Unit Setup Form matches the data on the customer setup screen (pay particular attention to positions 3 and 4 of entry field 5).<br><br>If they match, press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **100B00** | The facility option was entered but the characters are not hexadecimal (0 through 9 or A through F).<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100C00** | The packet window size option is invalid because it is less than 02.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100D00** | The packet window size option is invalid because it is greater than 07 and Modulo 8 is specified.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **100E00** | Reserved. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **100F00** | The packet size option is not equal to 064, 128, or 256.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the 5294 Control Unit service representative. |
| **101000** | The closed user group option does not contain 2 decimal digits.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **101100** | An invalid control character was entered.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the control character. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **101200** | The host network address is missing for a Call command.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the address. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **101300** | An A, O, C, or D was not entered as the first control character.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the first control character. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **101400** | A network address was entered for a permanent virtual circuit (PVC).<br><br>A mismatch might exist between the entry fields on the 5294 Control Unit Setup Form and customer setup screen. If you are not sure, you should verify that the data on the 5294 Control Unit Setup Form matches the data on the customer setup screen (pay particular attention to position 2 of entry field 5).<br><br>If they match, press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **101500** | The password option was entered for a permanent virtual circuit (PVC).<br><br>A mismatch might exist between the entry fields on the 5294 Control Unit Setup Form and customer setup screen. If you are not sure, you should verify that the data on the 5294 Control Unit Setup Form matches the data on the customer setup screen (pay particular attention to position 2 of entry field 5).<br><br>If they match, press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **101600** | The password option is invalid because it is not alphameric.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the password. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **101700** | The logical channel identifier option was entered for an Answer command.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **101800** | The closed user group option was entered either for an Answer command or an Open command.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **101900** | The Q option was selected with the Answer command.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |
| **101A00** | An F (facility) control character or an R (reversed charging) was entered for an Answer command or a PVC.<br><br>A mismatch might exist between the entry fields on the 5294 Control Unit Setup Form and customer setup screen. If you are not sure, you should verify that the data on the 5294 Control Unit Setup Form matches the data on the customer setup screen (pay particular attention to position 2 of entry field 5).<br><br>If they match, press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **101B00** | The logical link control value option is invalid.<br><br>Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard to display the keyboard-entered option. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>If still unsuccessful, call the host system operator. |

## Communications Network Error Codes (X.25 Only)

If the 5294 Control Unit accepts the keyboard-entered options, but the network operation with the host system fails, a code that indicates the type of communications problem is shown on the attached work stations. If one of the following error codes is shown, contact your supervisor because you will have to restart the job. To restart communications, go to "Chapter 2. Communications Procedures."

| Error Code | Meaning |
|---|---|
| **1100ff** | The data termination equipment (5294 Control Unit) issued a clear request packet after detecting an error.<br><br>The cause of the error is contained in the diagnostic field (ff). The diagnostic codes that apply to the 1100ff error code follow.<br><br>**Diagnostic Code** — **Meaning and Recovery Procedure**<br><br>**14** — Invalid packet type for state p1.<br>Retry the operation. You may be allowed temporary operation. However, you should report the error to the network service representative.<br><br>**15** — Invalid packet type for state p2.<br>Retry the operation. You may be allowed temporary operation. However, you should report the error to the network service representative.<br><br>**17** — Invalid packet type for state p4.<br>Retry the operation. You may be allowed temporary operation. However, you should report the error to the network service representative.<br><br>**50** — General ELLC/QLLC error.<br>Report the problem to the host system operator.<br><br>**51** — Undefined ELLC C-field.<br>Report the problem to the host system operator.<br><br>**52** — Unexpected ELLC C-field.<br>Report the problem to the host system operator.<br><br>**53** — Missing ELLC I-field.<br>Report the problem to the host system operator.<br><br>**54** — Undefined ELLC I-field.<br>Report the problem to the host system operator.<br><br>**55** — ELLC I-field too long.<br>Report the problem to the host system operator.<br><br>**56** — ELLC frame reject received.<br>Report the problem to the host system operator.<br><br>**57** — ELLC header invalid.<br>Report the problem to the host system operator. |

| Error Code | Meaning | |
|---|---|---|
| 1100ff (cont.) | Diagnostic Code | Meaning and Recovery Procedure |
| | 58 | Data received in wrong state.<br><br>Report the problem to the host system operator. |
| | 59 | Time-out (LT1 x LN2) condition.<br><br>Report the problem to the host system operator. |
| | 5A | LNr invalid.<br><br>Report the problem to the host system operator. |
| | 5B | Recovery rejected/terminated.<br><br>Report the problem to the host system operator. |
| | 60 | General PSH error.<br><br>Host system or network problem. Report the error to the host system operator. |
| | 61 | PSH sequence error.<br><br>Host system or network problem. Report the error to the host system operator. |
| | A1 | Invalid M-bit packet sequence.<br><br>Report the problem to the host system operator. |
| | A6 | Packet too short.<br><br>Check that the packet size entered (in the configuration or manually entered) matches the network subscription. |
| | A7 | Packet too long.<br><br>Check that the packet size entered (in the configuration or manually entered) matches the network subscription. |
| | AB | Invalid Ps.<br><br>Report the error to the network service representative. |
| | AC | Invalid Pr.<br><br>Report the error to the network service representative. |
| | AD | Invalid D-bit received.<br><br>Report the error to the host system operator. |
| | D0 | General resources.<br><br>Retry the operation. Other applications may operate normally. However, you should report the error to the host system operator. |

| Error Code | Meaning | |
|---|---|---|
| **1100ff (cont.)** | **Diagnostic Code** | **Meaning and Recovery Procedure** |
| | **D2** | PIU too long.<br><br>Retry the operation. Other application may operate normally. However, you should report the error to the host system operator. |
| | **E6** | Facility parameters not supported.<br><br>Report the error to the host system operator. |
| | **E8** | Unexpected calling DTE.<br><br>Verify that you entered the correct network address for the host system and retry the operation. If the problem continues, report the error to the host system operator. |
| | **E9** | Invalid D-bit requested.<br><br>There is a host system problem or you are connected to the wrong DTE. Report the problem to the host system operator. |
| | **EA** | Reset indication on virtual call.<br><br>Wait, then retry the operation. If the error recurs, report the problem to the host system operator. |
| | **EB** | Invalid protocol identifier.<br><br>Verify that the LLC protocol entered (in the configuration or manually entered) is correct. Retry the operation. If the error recurs, report the problem to the host system operator. |
| | **EC** | Password mismatch.<br><br>Verify that the password entered is correct. Retry the operation. If the error recurs, report the problem to the host system operator. |
| | **ED** | Invalid facility length.<br><br>Report the error to the host system operator. |

| Error Code | Meaning |
|---|---|
| **1200ff** | The data termination equipment (5294 Control Unit) issued a reset request packet after detecting an error. If one of the following error codes is shown, contact your supervisor because you will have to restart the job. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>The cause code is contained in the diagnostic field (ff). The cause codes that apply to the 1200ff error code follow.<br><br>**Diagnostic Code** — **Meaning and Recovery Procedure**<br><br>**1B** — Invalid packet type for state d1.<br>Retry the operation. You may be allowed temporary operation. However, you should report the error to the network service representative.<br><br>**50** — General ELLC/QLLC error.<br>Report the problem to the host system operator.<br><br>**51** — Undefined ELLC C-field.<br>Report the problem to the host system operator.<br><br>**52** — Unexpected ELLC C-field.<br>Report the problem to the host system operator.<br><br>**53** — Missing ELLC I-field.<br>Report the problem to the host system operator.<br><br>**54** — Undefined ELLC I-field.<br>Report the problem to the host system operator.<br><br>**55** — ELLC I-field too long.<br>Report the problem to the host system operator.<br><br>**56** — ELLC frame reject received.<br>Report the problem to the host system operator.<br><br>**57** — ELLC header invalid.<br>Report the problem to the host system operator.<br><br>**58** — Data received in wrong state.<br>Report the problem to the host system operator.<br><br>**59** — Time-out (LT1 x LN2) condition.<br>Report the problem to the host system operator. |

| Error Code | Meaning | |
|---|---|---|
| 1200ff (cont.) | **Diagnostic Code** | **Meaning and Recovery Procedure** |
| | **5A** | LNr invalid.<br><br>Report the problem to the host system operator. |
| | **5B** | Recovery rejected/terminated.<br><br>Report the problem to the host system operator. |
| | **60** | General PSH error.<br><br>Host system or network problem. Report the error to the host system operator. |
| | **61** | PSH sequence error.<br><br>Host system or network problem. Report the error to the host system operator. |
| | **A1** | Invalid M-bit packet sequence.<br><br>Report the problem to the host system operator. |
| | **A6** | Packet too short.<br><br>Check that the packet size entered (in the configuration or manually entered) matches the network subscription. |
| | **A7** | Packet too long.<br><br>Check that the packet size entered (in the configuration or manually entered) matches the network subscription. |
| | **AB** | Invalid P (S).<br><br>Report the error to the network service representative. |
| | **AC** | Invalid P (R).<br><br>Report the error to the network service representative. |
| | **AD** | Invalid D-bit received.<br><br>Report the error to the host system operator. |
| | **D0** | General resources.<br><br>Retry the operation. Other application may operate normally. However, you should report the error to the host system operator. |
| | **D2** | PIU too long.<br><br>Retry the operation. Other application may operate normally. However, you should report the error to the host system operator. |

<table>
<tr><th>Error Code</th><th>Meaning</th></tr>
<tr><td>18ccdd</td><td>The data communications equipment (DCE) issued a clear indication packet after detecting an error. If one of the following error codes is shown, contact your supervisor because you will have to restart the job. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>Most cause codes (cc) are issued by the network and so may vary from network to network.<br><br>The cause codes listed here are defined by CCITT Recommendation X.25. IBM does not guarantee that they will apply to your network. You should consult a representative of your network to determine the cause codes that apply to you.<br><br>Cause Code — Meaning and Recovery Procedure<br><br>00 — Error originated at host site.<br>Contact the host system operator to determine the cause.<br><br>01 — Host busy.<br>Wait, then retry the operation.<br><br>03 — Invalid facility request.<br>Ensure that the facility request was entered correctly and retry the operation. If the error recurs, report the problem to the network service representative.<br><br>05 — Network congestion.<br>Wait, then retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.<br><br>09 — Out of order – host not ready.<br>Wait, then retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.<br><br>0B — Access to the host not allowed.<br>Verify that you entered the correct network address for the host system, then retry the operation. If the problem continues, report the error to the host system operator.<br><br>0D — Unrecognized host network address.<br>Verify that you entered the correct network address for the host system, then retry the operation. If the problem continues, report the error to the host system operator.<br><br>11 — Error at the host system.<br>Report the error to the host system operator. Include the diagnostic code (dd).<br><br>13 — Error at the 5294 Control Unit.<br>Look at the diagnostic code (dd). Retry the operation. If the error recurs, report it to the person who planned the procedures.</td></tr>
</table>

| Error Code | Meaning |
|---|---|
| **18ccdd (cont.)** | **Cause Code** — **Meaning and Recovery Procedure**<br><br>**15** — Recognized Private Operating Agency (RPOA) out of order.<br>Verify that the correct RPOA facility is selected or select a different RPOA. If the error recurs, report the problem to the host system operator.<br><br>**19** — Reverse charging not subscribed.<br>Verify that you entered the correct host system address and the correct number for the reverse charge. Retry the operation. If the error recurs, report the problem to the host system operator.<br><br>**21** — Incompatible destination.<br>Verify that you entered the correct address. If the address is correct, report the problem to the host system operator.<br><br>**29** — Fast select not subscribed.<br>Verify that call establishment is correct. This facility should not be selected.<br><br>Diagnostic codes (dd) are issued by the network and, therefore, may vary from network to network. If one of the following codes is shown, contact your supervisor because you will have to restart the job. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>The diagnostic codes listed here are defined by CCITT Recommendation X.25. IBM does not guarantee that they will apply to your network. You should consult a representative of your network to determine the diagnostic codes that apply to you.<br><br>**Diagnostic Code** — **Description**<br>**00** — No additional information<br>**01** — Invalid send sequence – P (S)<br>**02** — Invalid receive sequence – P (R)<br>**10** — Invalid packet type<br>**11** — State r1<br>**12** — State r2<br>**13** — State r3<br>**14** — State p1<br>**15** — State p2<br>**16** — State p3<br>**17** — State p4<br>**18** — State p5<br>**19** — State p6<br>**1A** — State p7<br>**1B** — State d1<br>**1C** — State d2<br>**1D** — State d3 |

| Error Code | Meaning | |
|---|---|---|
| **18ccdd (cont.)** | **Diagnostic Code** | **Description** |
| | **20** | Packet not allowed |
| | **21** | Unidentifiable packet |
| | **22** | Call on one way logical channel |
| | **23** | Invalid packet type on a permanent virtual circuit |
| | **24** | Packet on unassigned logical circuit |
| | **25** | Reject not subscribed to |
| | **26** | Packet too short |
| | **27** | Packet too long |
| | **28** | Invalid general format identifier |
| | **29** | Restart with nonzero in bits 1−4, 9−16 |
| | **2A** | Packet type not compatible with facility |
| | **2B** | Unauthorized interrupt confirmation |
| | **2C** | Unauthorized interrupt |
| | **30** | Timer expired, general |
| | **31** | Timer expired for incoming call |
| | **32** | Timer expired for clear indication |
| | **33** | Timer expired for reset indication |
| | **34** | Timer expired for restart indication |
| | **40** | Call setup problem |
| | **41** | Facility code not allowed |
| | **42** | Facility parameter not allowed |
| | **43** | Invalid called address |
| | **44** | Invalid calling address |
| | **50** | Call clearing problem |
| | **51** | Nonzero address length field |
| | **52** | Nonzero facility length field |
| | **60-7F** | Not assigned |
| | **80-FF** | Network specific diagnostic information |

| Error Code | Meaning |
|---|---|
| **19ccdd** | The data circuit-terminating equipment (DCE) issued a reset indication packet after detecting an error. If one of the following codes is shown, contact your supervisor because you will have to restart the job. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>Cause codes (cc) are issued by the network and so may vary from network to network.<br><br>The cause codes listed here are defined by CCITT Recommendation X.25. IBM does not guarantee that they will apply to your network. You should consult a representative of your network to determine the cause codes that apply to you.<br><br>**Cause Code** — **Meaning and Recovery Procedure**<br><br>**00** — Error originated at host system.<br>Contact the host system operator to determine the cause.<br><br>**01** — Out of order – disconnected host system.<br>Wait, then retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.<br><br>**03** — Error at the host system.<br>Report the error to the host system operator. Include the diagnostic code (dd).<br><br>**05** — Error at the 5294 Control Unit.<br>Look at the diagnostic code (dd). Retry the operation. If the error recurs, report it to the person who planned the procedures.<br><br>**07** — Network congestion.<br>Wait, then retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.<br><br>**09** — Remote DTE operational.<br>This is not an error. It is a normal condition at start-up.<br><br>**0F** — Network operational.<br>This is not an error. It is a normal condition at start-up.<br><br>**11** — Incompatible destination.<br>Verify that you entered the correct address. If the address is correct, report the problem to the host system operator. |

| Error Code | Meaning |
|---|---|
| **19ccdd (cont.)** | Diagnostic codes (dd) are issued by the network and, therefore, may vary from network to network.<br><br>The diagnostic codes listed here are defined by CCITT Recommendation X.25. IBM does not guarantee that they will apply to your network. You should consult a representative of your network to determine the diagnostic codes that apply to you. |

| Diagnostic Code | Description |
|---|---|
| **00** | No additional information |
| **01** | Invalid send sequence – P (S) |
| **02** | Invalid receive sequence – P (R) |
| **10** | Invalid packet type |
| **11** | State r1 |
| **12** | State r2 |
| **13** | State r3 |
| **14** | State p1 |
| **15** | State p2 |
| **16** | State p3 |
| **17** | State p4 |
| **18** | State p5 |
| **19** | State p6 |
| **1A** | State p7 |
| **1B** | State d1 |
| **1C** | State d2 |
| **1D** | State d3 |
| **20** | Packet not allowed |
| **21** | Unidentifiable packet |
| **22** | Call on one way logical channel |
| **23** | Invalid packet type on a permanent virtual circuit |
| **24** | Packet on unassigned logical circuit |
| **25** | Reject not subscribed to |
| **26** | Packet too short |
| **27** | Packet too long |
| **28** | Invalid general format identifier |
| **29** | Restart with nonzero in bits 1 – 4, 9 – 16 |
| **2A** | Packet type not compatible with facility |
| **2B** | Unauthorized interrupt confirmation |
| **2C** | Unauthorized interrupt |
| **30** | Timer expired, general |
| **31** | Timer expired for incoming call |
| **32** | Timer expired for clear indication |
| **33** | Timer expired for reset indication |
| **34** | Timer expired for restart indication |
| **40** | Call setup problem |
| **41** | Facility code not allowed |
| **42** | Facility parameter not allowed |
| **43** | Invalid called address |
| **44** | Invalid calling address |
| **50** | Call clearing problem |
| **51** | Nonzero address length field |
| **52** | Nonzero facility length field |
| **60-75** | Not assigned |
| **80-FF** | Network specific diagnostic information |

| Error Code | Meaning |
|---|---|
| **1Accdd** | A restart was issued by the DCE. If one of the following codes is shown, contact your supervisor because you will have to restart the job. To restart communications, go to "Chapter 2. Communications Procedures."<br><br>Most cause codes (cc) are issued by the network and so may vary from network to network.<br><br>The cause codes listed here are defined by CCITT Recommendation X.25. IBM does not guarantee that they will apply to your network. You should consult a representative of your network to determine the cause codes that apply to you.<br><br>**Cause Code** — **Meaning and Recovery Procedure**<br><br>**00** — DTE (host) originated.<br>Contact the host system operator to determine the cause.<br><br>**01** — Procedure error at the 5294 Control Unit.<br>Look at the diagnostic code (dd). Retry the operation. If the error recurs, report it to the person who planned the procedures.<br><br>**03** — Error at the host.<br>Wait, then retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.<br><br>**07** — Network is operational.<br>This is not an error. This is a normal condition at start-up.<br><br>Diagnostic codes (dd) are issued by the network and, therefore, may vary from network to network.<br><br>The diagnostic codes listed here are defined by CCITT Recommendation X.25. IBM does not guarantee that they will apply to your network. You should consult a representative of your network to determine the diagnostic codes that apply to you.<br><br>**Diagnostic Code** — **Description**<br><br>**00** No additional information<br>**01** Invalid send sequence – P (S)<br>**02** Invalid receive sequence – P (R)<br>**10** Invalid packet type<br>**11** State r1<br>**12** State r2<br>**13** State r3<br>**14** State p1<br>**15** State p2<br>**16** State p3<br>**17** State p4<br>**18** State p5<br>**19** State p6<br>**1A** State p7<br>**1B** State d1<br>**1C** State d2<br>**1D** State d3 |

| Error Code | Meaning |
|---|---|
| **1Accdd (cont.)** | **Diagnostic Code** — **Description**<br><br>**20** Packet not allowed<br>**21** Unidentifiable packet<br>**22** Call on one way logical channel<br>**23** Invalid packet type on a permanent virtual circuit<br>**24** Packet on unassigned logical circuit<br>**25** Reject not subscribed to<br>**26** Packet too short<br>**27** Packet too long<br>**28** Invalid general format identifier<br>**29** Restart with nonzero in bits 1−4, 9−16<br>**2A** Packet type not compatible with facility<br>**2B** Unauthorized interrupt confirmation<br>**2C** Unauthorized interrupt<br>**30** Timer expired, general<br>**31** Timer expired for incoming call<br>**32** Timer expired for clear indication<br>**33** Timer expired for reset indication<br>**34** Timer expired for restart indication<br>**40** Call setup problem<br>**41** Facility code not allowed<br>**42** Facility parameter not allowed<br>**43** Invalid called address<br>**44** Invalid calling address<br>**50** Call clearing problem<br>**51** Nonzero address length field<br>**52** Nonzero facility length field<br>**60-75** Not assigned<br>**80-FF** Network specific diagnostic information |
| **1Bxx00** | The data termination equipment (5294 Control Unit) issued a reset request packet after detecting an error.<br><br>The cause code is contained in the cause field (xx). The cause codes that apply to the 1Bxx00 error code follow.<br><br>**Cause Code** — **Description**<br><br>**A5** Diagnostic packet received[3]<br>**A6** Packet length less than 2<br>**A8** Invalid GFI (restart indication/confirmation only)<br>**11** Unsolicited restart confirmation received<br>**E2** LCID not equal to 0 on restart indication/confirmation<br>**31** Call connected not received within 200 seconds<br>**32** Clear confirmation not received within 200 seconds<br>**33** Reset confirmation not received within 200 seconds<br>**34** Restart confirmation not received within 200 seconds |

3 The error code for Diagnostic Packet Received has two additional descriptive bytes appended, 1BA5yy, for example. The definitions of yy are described in *The X.25 Interface for Attaching IBM SNA Nodes to Packet-Switched Data Networks General Information Manual*, GA27-3345.

## Keyboard-Entered Options Error Codes (X.21 Switched Only)

If the 5294 has the X.21 Switched-Circuit feature and an error occurs during the keyboard entry of commands, options, or parameters, a 6-digit error code in the form 20xxxx (where the xxxx represents 4 hexadecimal digits) is displayed.

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **200000** | A Call command is already in progress (not in session).<br><br>Wait until the Call command is complete, or an error code other than 200000 is displayed. |
| **200100** | The switched-circuit was successfully disconnected.<br><br>The operator may make another call. |
| **200200** | The operator attempted a Detach command while a Call command was in progress or no command was in progress.<br><br>Wait until the previous command completes; then try again. If no command was in progress, try to make a call. |
| **201100** | The host system is busy at the network address keyed in.<br><br>Wait until the host system is not busy, or try a different address. |

## Communications Network Error Codes (X.21 Switched Only)

If the 5294 Control Unit accepts the keyboard-entered options, but the network operation with the host system fails, a code that indicates the type of communication problem is shown on the attached work stations.

The 21xx00 error codes occur when a call progress signal is in progress with the host system. The cause of the error is contained in the field xx.

For error codes 21xx00 and 23xx00, the xx is the call progress signal from the network.

For non-Japanese networks:

- If the first x is 2 or 6:
  1. Wait five seconds between calls within a series.
  2. Try a maximum of eight times per series.
  3. Wait 30 seconds before trying another series.
- If the first x is 4, 5, or 7, wait 30 seconds before calling the same number. (No wait is necessary if you call a different number.)

For Japanese networks:

- If the first x is 2 or 6:
  1. There is no minimum wait between calls within a series.
  2. Try a maximum of three times per series.
  3. Wait 10 minutes before trying another series.
- If the first x is 4, 5, or 7, wait 10 minutes before calling the same number. (No wait is necessary if you call a different number.)

Some networks use call progress signals (field xx) differently.

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **210000** | Reserved |
| **210100** | The incoming call was received by the host system. Communications should be established shortly.<br><br>Wait one minute or until an error code other than 20xx00 is displayed. This status is temporary. |
| **210200** | The call is being redirected to a number other than the one entered.<br><br>Wait one minute or until an error code other than 20xx00 is displayed. This status is temporary. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **210300** | The call was queued and the communications will be established when the host system is not busy.<br><br>Wait one minute or until an error code other than 20xx00 is displayed. This status is temporary. |
| **212000** | There is no connection.<br><br>Ensure that the number called is correct and try the operation again after one minute. This is a DCE or a network error. |
| **212100** | The number is busy.<br><br>Ensure that the number called is correct and try the call again. If the number is busy for longer than normal, call the host system operator to see if the system port for the number called is actually busy. If the host system port and the DCE for the number called is ready and not busy, there is a network problem. |
| **212200** | There is a procedure error in the selection signals sent to the network (for example, incorrect format).<br><br>Ensure that the operating procedures are correct and try the operation again. If the same failure occurs, the problem is caused by the DCE or the network. |
| **212300** | The network detected a transmission error in the selection signals.<br><br>Ensure that the number called is correct and try the operation again. This is a DCE or a network error. |
| **214100** | Access is barred. The 5294 Control Unit is not allowed to connect to the host system.<br><br>Ensure that the number called is correct and that the operating procedures and configuration are compatible with the network subscription for the 5294 Control Unit and the host system location. If the procedures and configuration are correct and compatible, the failure is a network problem. |
| **214200** | The number you are calling has changed.<br><br>Ensure that the number called is correct and that the operating procedures and configuration are compatible with the network subscription for the 5294 Control Unit and the host system location. If the procedures and configuration are correct and compatible, the failure is a network problem. |
| **214300** | The called DTE address is not valid or not assigned to any DTE, or the user class of service is not compatible.<br><br>Ensure that the number called is correct and that the operating procedures and configuration are compatible with the network subscription for the 5294 Control Unit and the host system location. If the procedures and configuration are correct and compatible, the failure is a network problem. |
| **214400** | The number you called is out of order.<br><br>Ensure that the number called is correct, that the host system you called and the DCE are powered on and ready, and that the 5294 Control Unit is varied on. If the host system and DCE are powered on and ready, and the 5294 Control Unit is varied on, then the failure is a network problem. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **214500** | The called DTE is signaling controlled not ready.<br><br>Ensure that the number called is correct, that the host system you called and the DCE are powered on and ready, and that the 5294 Control Unit is varied on. If the host system and DCE are powered on and ready, and the 5294 Control Unit is varied on, then the failure is a network problem. |
| **214600** | The called DTE is signaling uncontrolled not ready.<br><br>Ensure that the number called is correct, that the host system you called and the DCE are powered on and ready, and that the 5294 Control Unit is varied on. If the host system and DCE are powered on and ready, and the 5294 Control Unit is varied on, then the failure is a network problem. |
| **214700** | The called DTE is powered off.<br><br>Ensure that the number called is correct, that the host system you called and the DCE are powered on and ready, and that the 5294 Control Unit is varied on. If the host system and DCE are powered on and ready, and the 5294 Control Unit is varied on, then the failure is a network problem. |
| **214800** | The facility request code is not valid.<br><br>Ensure that the facility request code is correct and that the operating procedures and configuration are compatible with the network subscription for the 5294 Control Unit and the host system location. If the procedures and configuration are correct and compatible, the failure is a network problem. |
| **214900** | There is a network problem in the local loop at the DCE you called.<br><br>Ensure that the number called is correct and that the operating procedures and configuration are compatible with the network subscription for the 5294 Control Unit and the host system location. If the procedures and configuration are correct and compatible, the failure is a network or DCE problem. |
| **215100** | The number called cannot be obtained.<br><br>Ensure that the number called is correct and that the operating procedures and configuration are compatible with the network subscription for the 5294 Control Unit and the host system location. If the procedures and configuration are correct and compatible, the failure is a network or DCE problem. Call the network information service to find out why the number called is temporarily unobtainable. |
| **215200** | The user class of service is not compatible.<br><br>Ensure that the number called is correct and that the operating procedures and configuration are compatible with the network subscription for the 5294 and the host system locations. If the procedures and configuration are correct and compatible, the failure is a network problem. |
| **216000** | There is no connection.<br><br>Ensure that the number called is correct and try the operation again. This is a DCE or a network error. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **216100** | The network is congested.<br><br>Ensure that the number called is correct and try the operation again after one minute. This is a network error. |
| **217100** | There is long-term network congestion.<br><br>The failure is caused by a network problem. Report the problem to the network service representative. |
| **217200** | The Recognized Private Operating Agency (RPOA) is out of order.<br><br>The failure is caused by an RPOA problem or a network problem. Report the problem to the RPOA representative. |
| **218100** | The registration/cancellation is confirmed. This is part of the procedure used to initialize a call.<br><br>This is a confirmation of the facility registration or cancellation, not an error. |
| **218200** | The redirection of the call was activated.<br><br>This is a confirmation of the facility registration activation, not an error. |
| **218300** | The redirection of the call was deactivated.<br><br>This is a confirmation of the facility registration deactivation, not an error. |
| **220000** | An invalid XID was received (invalid short-hold indicators).<br><br>Ensure that the number called was correct. If the number called was correct, there is a host system programming error or a configuration problem. |
| **220100** | An invalid XID was received (more than 27 digits were received or the number of digits received does not equal the number of digits specified for short hold mode.)<br><br>Ensure that the number called was correct. If the number called was correct, there is a host system programming error or a configuration problem. |
| **220200** | The wrong XID was received.<br><br>Ensure that the number called was correct. If the number called was correct, there is a host system programming error or a configuration problem. |
| **220300** | An XID was required and was not received first.<br><br>Ensure that the number called was correct. If the number called was correct, there is a host system programming error or a configuration problem. |
| **220400** | A DCE clear was received during call selection.<br><br>The failure is caused by a network or DCE problem. Report the problem to the network service representative. |
| **220500** | There was a transition to SDLC during a message.<br><br>The failure is caused by a network or DCE problem. Report the problem to the network service representative. |

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **220600** | An X.21 message was too long for the buffer.<br><br>The failure is caused by a network or DCE problem. Report the problem to the network service representative. |
| **220700** | An attempt was made to send an X.21 message to the network in SDLC state.<br><br>Contact your 5294 Control Unit service representative and report the error code. |
| **220800** | An attempt was made to send an SDLC frame to the network in X.21 state.<br><br>Contact your 5294 Control Unit service representative and report the error code. |
| **220900** | An X.21 message was received in the not ready queue.<br><br>Contact your 5294 Control Unit service representative and report the error code. |
| **221000** | A time-out (T1) for proceed to select response.<br><br>The failure is caused by a network or DCE problem. Report the problem to the network service representative. |
| **221102** | A time-out (T2) for selection signal response.<br><br>The failure is caused by a network or DCE problem. Report the problem to the network service representative. |
| **221103** | A time-out (T3A or T3B) for call progress signal response.<br><br>The failure is caused by a network or DCE problem. Report the problem to the network service representative. |
| **221104** | A time-out (T4) for call accepted response.<br><br>The failure is caused by a network or DCE problem. Report the problem to the network service representative. |
| **221300** | A call collision error occurred.<br><br>Try the operation again. If the error occurs again, contact your 5294 Control Unit service representative and report the error code. |
| **221400** | A DCE clear was received in data transfer state. Connection to the host system was lost.<br><br>Ensure that the number called is correct. If the number called is correct, there is a host system or network problem. |
| **23xx00** | A call progress signal was received from the network, but a call was not placed.<br><br>The failure is caused by a network or DCE problem. Report the problem to the network service representative. |
| **240000** | The DTE received an invalid call progress signal.<br><br>The failure is caused by a network or DCE problem. Report the problem to the network service representative. |

# Chapter 4. Running the Verification Tests

The verification tests check out the functions of work stations.

Throughout these tests, you are required to make selections from a menu. If you make a selection error, the tests will not proceed. To recover from a selection error, you can:

- Backspace and enter the correct selection over the incorrect one (if you have not yet pressed the Enter/Rec Adv key).
- Press the C and Enter/Rec Adv keys. This will return you to the Prime Option Menu, where you can make another selection.

Do the following to run the verification tests:

1. If necessary, start communications with the host system.
2. When the sign-on screen is displayed, press the Cmd key.
3. Press the Test Request (Character Backspace) key. (If your display station is a 3179, a 3180, or a 3196, press and hold the Alt key while you press the Test key.)

The following Prime Option Menu is displayed.

**Note:** The exact format of the display screens might vary from host system to host system.

```
PRIME OPTION MENU                  SELECT OPTION                DISPLAY AB

 C  END                                 3 CONFIGURATION DATA
 1  DISPLAY VERIFICATION                4 ERAP
 2  WORK STATION PRINTER VERIFICATION

USE THE FOLLOWING LINES TO VERIFY CORRECT OPERATION OF KEYBOARD DATA KEYS
```

4. Select desired option:

   C   END: This option returns you to the Prime Option Menu.

   1   DISPLAY VERIFICATION: This option provides test patterns that show various character display capabilities; a test is also performed on the function keys.

   2   WORK STATION PRINTER VERIFICATION: This option checks out a printer. A printed report shows print patterns for analysis.

   3   CONFIGURATION DATA: This option displays descriptive information, including addresses, on system devices.

   4   ERAP: This option displays or prints the errors that are stored in the host system for the 5294 Control Unit and attached work stations.

5. Press the Enter/Rec Adv key.

   Follow the instructions and prompts provided with each option.

**Note:** See the appropriate work station *Operator's Guide* for operational requirements and meaning of error codes.

# Appendix A. Running the Extended Test Routine

**A.0**

Before you run the extended test routine:

- Write down the displayed error code if you haven't already done so.
- Check that the modem is correctly set up.
- Check that the modem is powered on.

**Notes:**

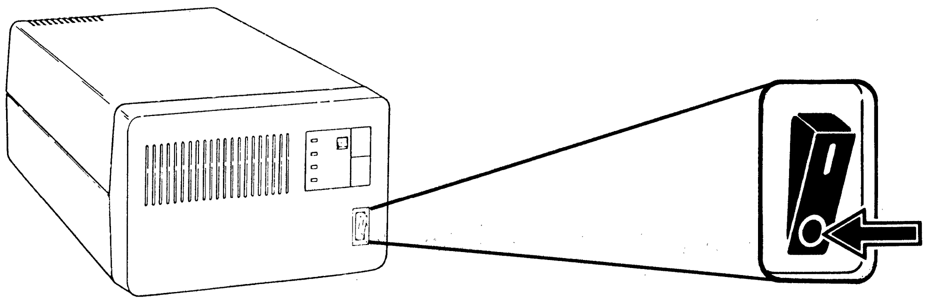
1. If you made any changes to the modem, do the following:
   a. Set the 5294 Control Unit Power switch to Off.
   b. Set the 5294 Control Unit Test/Normal switch to Normal.
   c. Set the 5294 Control Unit Power switch to On.
   d. Retry the job. If the same failure occurs again, run the extended test routine.
2. If you did not make any changes to the modem, you should run this test even though you may not know whether the modem is correctly setup and is powered on.

**A.1**

**To run the extended test routine, do the following:**

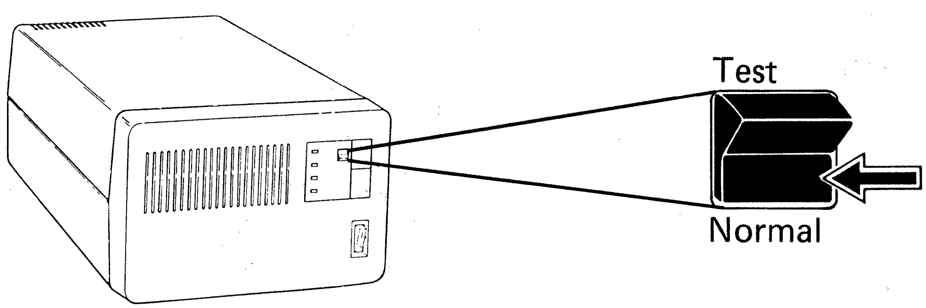
1. Ensure that all jobs are terminated on all attached display stations and printers.

2. Set the 5294 Control Unit Power switch to Off.



**A.2**

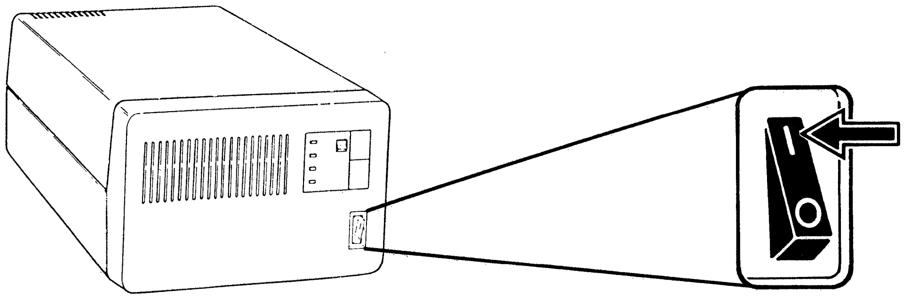
**Set the 5294 Control Unit Test/Normal switch to Normal.**



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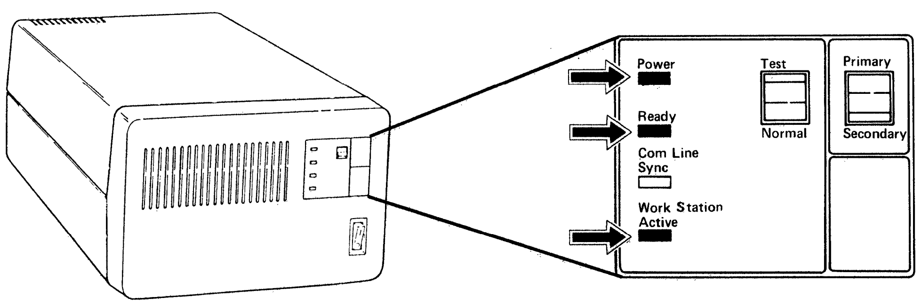
A.3

**Set the 5294 Control Unit Power switch to On.**



The following indicators on the 5294 Control Unit should come on within 30 seconds.

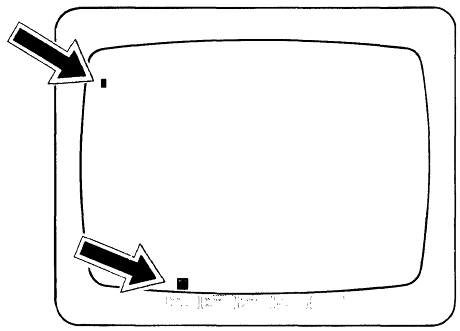
- Power
- Ready
- Work Station Active




Frame A.3 Continued

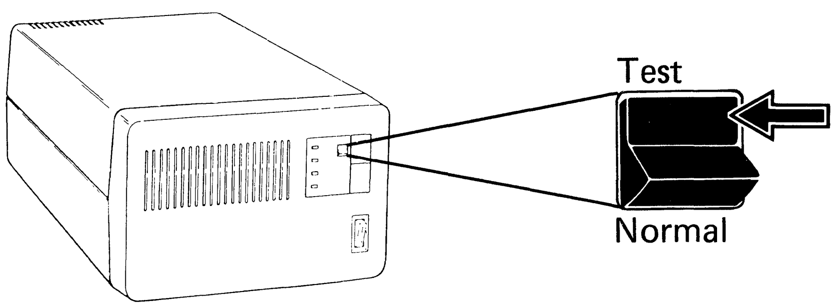
Also, the following indicators on all attached display stations should come on:

- Cursor in the upper left corner of the display screen
- System Available



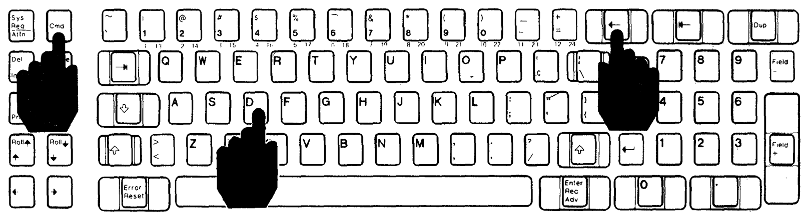
**A.4**

**Set the 5294 Control Unit Test/Normal switch to Test.**

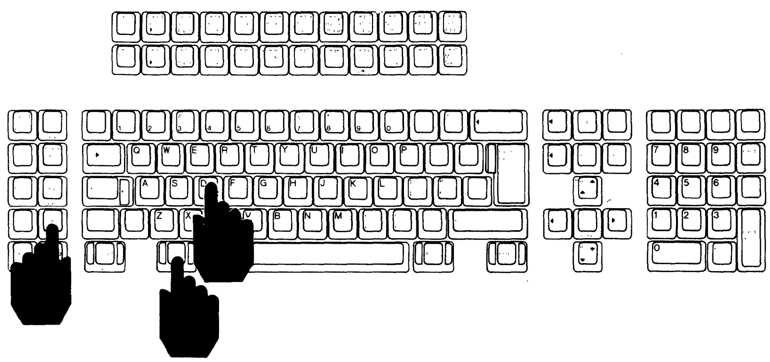


**A.5**

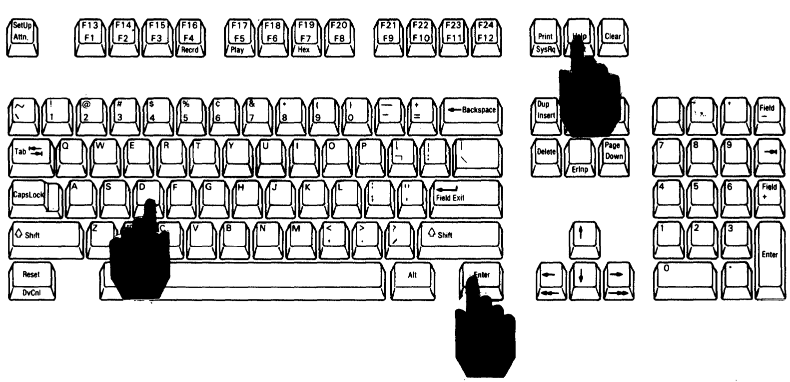
**Press the Error Reset/Reset key on the display station keyboard. If the display station is a 5292 Model 1 or Model 2, a 5291, or a 5251 Model 11, press the Command key, then the Character Backspace key, and then the D key on the display station keyboard.**



If the display station is a 3179 Model 2 or a 3180 Model 2, or some 3196 keyboards, press and hold the Alt key, then press the Test key, and then press the D key on the display station keyboard.



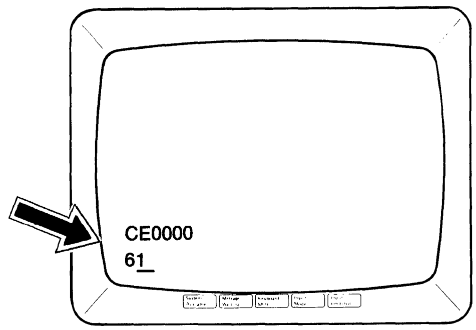
If the display station has an IBM Enhanced Keyboard, press and hold the Alt key, then press the Test key, and then press the D key on the display station keyboard.



*Frame A.5 Continued*

**Note** Refer to the *IBM Multistation 5550-5250 Personal Computer User's Guide* for the key location.

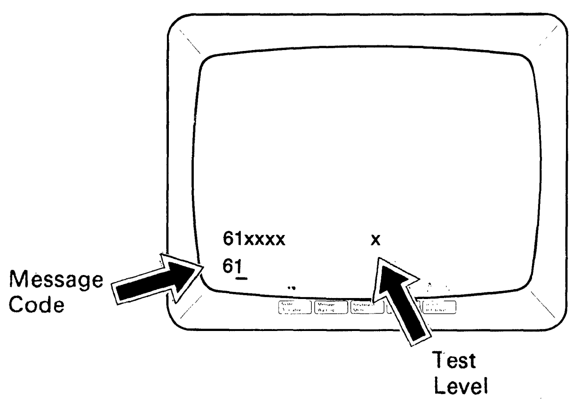
The following message code should appear on the display screen within 5 seconds.




**A.6**

**Press the Enter/Rec Adv [Enter Rec Adv] key.**

The message code on the display screen should change within 5 seconds.




If the CE0000 message code does not appear, repeat frames A.1 through A.5

If the CE0000 message code still does not appear, contact your 5294 Control Unit service representative.

A.7

- Observe the displayed message code on the screen.
- Locate the message code in the following list, go to the indicated frame, and follow the instructions provided with each code.

**Note:** Disregard the displayed test level digit unless the digit is provided with the message code.

| Message Code | Frame Number |
|---|---|
| 610004 | A.8 |
| 610005 | A.9 |
| 610006 | A.10 |
| 610007 | A.11 |
| 618xxx | A.12 |

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A.8

| Message Code | Test Level | Instructions |
|---|---|---|
| 610004 | | **CAUTION** Avoid connecting or disconnecting an electrical cable during an electrical storm. However, at all other times, even though power is on the 5294 Control Unit, connecting or disconnecting a communication cable does not present a safety hazard. |

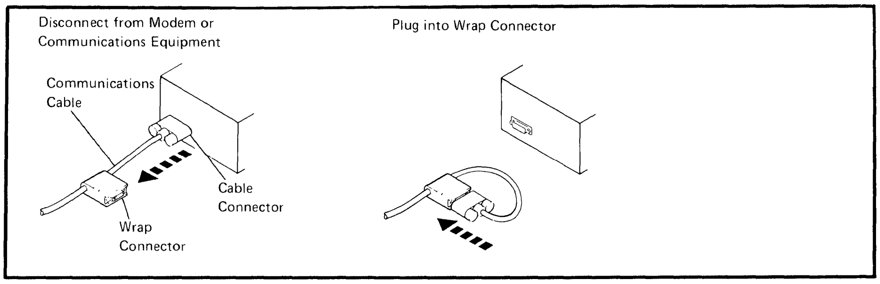
1. Find your type of communications cable in one of the following illustrations.

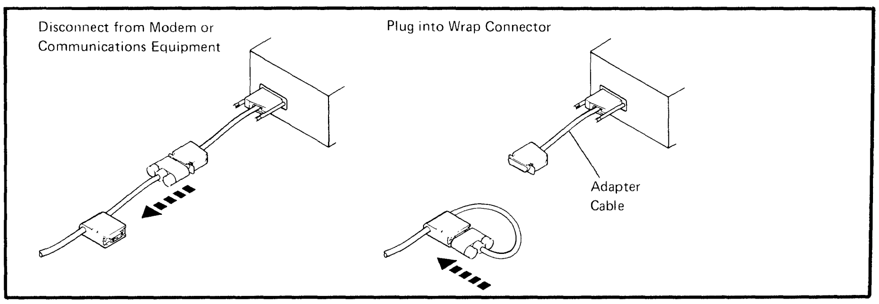
2. Disconnect the cable from the modem or communications equipment.

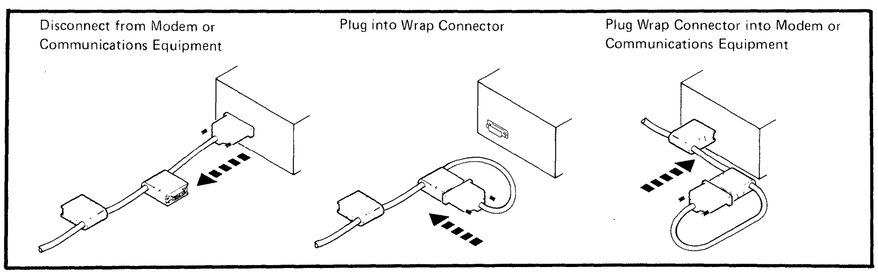
3. Connect the cable connector to the wrap connector as shown.

***Frame A.8 Continued***

| Message Code | Test Level | Instructions |
|---|---|---|
| 610004 (cont'd) | | After connecting the wrap connector, press the Enter/Rec Adv key and wait 5 seconds for the next message on the display screen. |
| | | Return to A.7 . |



**A.9**

| Message Code | Test Level | Instructions |
|---|---|---|
| 610005 | | Set the appropriate switch on the attached modem or communications equipment to the position that selects an analog loopback (may be abbreviated AL) or local loopback (may be abbreviated LL); press the Enter/Rec Adv key, wait 5 seconds for the next message code, and return to **A.7**. <br><br> If your modem does not have this capability, press the Enter/Rec Adv key and wait 5 seconds for the next message code. <br><br> Return to **A.7**. |

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A.10

| Message Code | Test Level | Instructions |
|---|---|---|
| 610006 | | **Do the following:** |

1. Go to the modem and observe the switches on the operating panel. Return to the normal operating position the switch that selects analog loopback (may be abbreviated AL) or local loopback (may be abbreviated LL).

2. Go to the modem/DCE and set the switch to the position, or press the appropriate button to cause the remote (host system) modem/DCE to loopback (return) data sent to it. This switch or button is usually labeled Remote Loopback (abbreviated RL).

3. If your modem/DCE does not have remote loopback capability, contact the host system operator and have the operator set the host system modem to loop (return) data back to the communications line.

   If the 5294 Control Unit is attached to an IBM 3872, an IBM 3874, or an IBM 3875 modem, have the host system operator set the modem Test/Operate switch to the T3 position. For other modems, the Test/Operate switch is usually labeled Digital Loopback (abbreviated DL).

***Frame A.1( Continued***

| Message Code | Test Level | Instructions |
|---|---|---|
| 610006 (cont'd) | | **Do the following:** |

4. If you were able to complete the previous instructions:
   a. Press the Enter key.
   b. Wait 5 seconds for the next message code.
   c. Return to A.7.

5. If you were not able to complete the previous instructions because the modem attached to the host system does not have loopback capability, report to the host system operator:
   a. That the 5294 Control Unit is operating correctly.
   b. That the modem attached to the 5294 Control Unit successfully completed the local loopback test.

6. To complete the extended test routine, do the following:
   a. Press the Reset key on the display station keyboard.
   b. Set the 5294 Control Unit Power switch to Off.
   c. Set the 5294 Control Unit Test/Normal switch to Normal.
   d. Set the 5294 Control Unit Power switch to On.
   e. Sign on to the host system and establish normal operation.

A.11

| Message Code | Test Level | Instructions |
|---|---|---|
| 610007 | ? | **Do the following:** |

1. Write down the message code and the test level digit shown on the screen (for example, 610007 x).
2. Set the 5294 Control Unit Power switch to Off.
3. Set the 5294 Control Unit Test/Normal switch to Normal.
4. Disconnect the wrap connector and reconnect the communications cable to the modem or communications equipment (only if you disconnected the communications cable during the routine).
5. If you changed any switch on the modem/DCE during the routine, return the switch to its normal operating position. In addition, if any switch was changed on the modem/DCE at the host site, have the host system operator return the switch to its normal operating position.
6. Set the 5294 Control Unit Power switch to On.

*Frame A.11 Continued*

| Message Code | Test Level | Instructions |
|---|---|---|
| 610007 (cont'd) | ? | **Do the following:** |

7. If you ran the extended test routine because of a 004x or 005x error code, go to step 8. If you ran the extended test routine because communications cannot be established with the host system, and no 004x or 005x error code was displayed, go to step 9.

8. You are doing this step because a 004x or 005x error code was displayed on the screen.
   a. To complete the extended test routine, return to Communications Error Codes in Chapter 3. Locate the original 004x or 005x error code (the one that you wrote down) and follow the reporting instructions as specified by the error code.

9. You are doing this step because communications cannot be established with the host system, and no error code was displayed on the screen.
   a. If the test level digit is 3 (610007 3), to complete the extended test routine, report to the host system operator that a communications failure exists and the 5294 Control Unit operates error free.

***Frame A.11 Continued***

| Message Code | Test Level | Instructions |
|---|---|---|
| 610007 (cont'd) | ? | **Do the following:** |

b. If the test level digit is 4 (610007 4), to complete the extended test routine, report to the host system operator that:
   1) A communications failure exists.
   2) The 5294 Control Unit operates error free.
   3) The attached modem successfully completed a local loopback test. A remote loopback test is not allowed by the configuration.

c. If the test level digit is 6 (610007 6), to complete the extended test routine, report to the host system operator that:
   1) A communications failure exists.
   2) The 5294 Control Unit operates error free.
   3) The attached modem and the communications network operate correctly.
   4) The host system modem successfully passed the remote loopback test.

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A.12

| Message Code | Test Level | Instructions |
|---|---|---|
| 618xxx | ? | **Do the following:** |

1. Write down the message code and the test level digit shown on the screen (for example, 618xxx x).
2. Set the 5294 Control Unit Power switch to Off.
3. Set the 5294 Control Unit Test/Normal switch to Normal.
4. Disconnect the wrap connector and reconnect the communications cable to the modem or communications equipment (only if you disconnected the communications cable during the routine).
5. If you changed any switch on the modem/DCE during the routine, return the switch to its normal operating position. In addition, if any switch was changed on the modem/DCE at the host site, have the host system operator return the switch to its normal operating position.
6. Set the 5294 Control Unit Power switch to On.

*Frame A.12 Continued*

| Message Code | Test Level | Instructions |
|---|---|---|
| 618xxx (cont'd) | ? | **Do the following:** |

7. Look at the message code and the test level digit that you wrote down in step 1. If the test level digit is 3 (618xxx   3), go to step 8; if the test level digit is 6 (618xxx   6), go to step 9.

8. You are doing this step because the test level digit is 3.
   a. To complete the extended test routine:
      1) Contact the 5294 Control Unit service representative.
      2) Report the message code (618xxx) and the test level digit (3).

9. You are doing this step because the test level digit is 6.
   a. To complete the extended test routine, report the following to the host system operator:
      1) The 5294 Control Unit is operating correctly.
      2) The modem attached to the 5294 Control Unit successfully completed the local loopback test.
      3) The remote loopback test to the host system modem failed.
      4) The failure was caused by either the communications network or the host system.

# Appendix B. Applications Setup Forms

The Applications Setup Form allows you to record information you will need to perform applications at a remote work station. A completed copy of the form should be retained at the host site and at each work station attached to the 5294.

If you use this form, contact the host system operator for instructions to complete it.

The host system operator can find instructions for completing this form in Appendix H of the *IBM 5250 Information Display System Planning and Site Preparation Guide.*

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## APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION

Setup instructions for the following applications:

______________________________________________

______________________________________________

______________________________________________

______________________________________________

Host Contact ____________________________________ Telephone ______________

**A** Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

**B** Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

**C** Enter the following as one line:

**D** Press Enter.

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## APPLICATIONS SETUP FORM--OPERATOR'S INFORMATION

Setup instructions for the following applications:

Host Contact

Telephone

**A** Press Error Reset on the typewriter-like keyboard or a Reset key on the data entry keyboard.

**B** Press and hold the Upper Shift key and press Sys Req/Attn to display the single-line format at the top of the screen.

**C** Enter the following as one line:

**D** Press Enter.

# Appendix C. Problem Checklist and Setup Error Codes

## Problem Checklist

If the Ds and Ps on your display do not match the information that is filled in on the *IBM 5294 Setup Form*, perform the following checks. Refer to *Control Unit Setup Procedure*, GA21-9369.

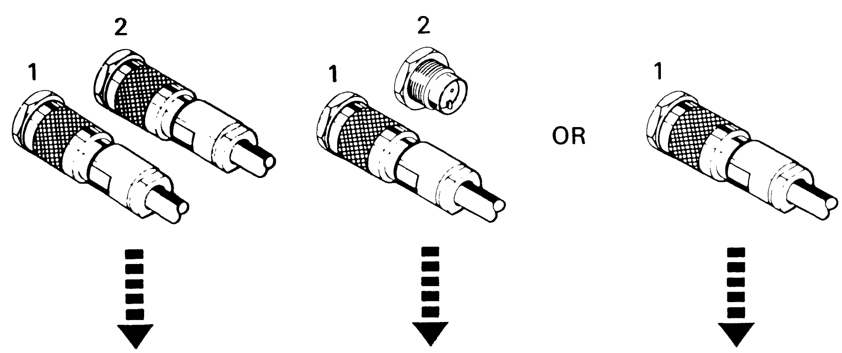
1. Make sure all the attaching display stations and printers are set up.

2. Make sure the Power switch on each attaching display station and printer is set to On.

3. Make sure *all* the cables connecting to the ports on the 5294 are connected and are securely fastened. Also make sure the cables are securely fastened at the other end.

4. Make sure the work station address of each work station is set correctly. If you are unsure of any work station address, contact your planner.

5. Check the Terminator switch on any work station that has one. Make sure it is set correctly. (Refer to Appendix C of the *Setup* manual for the location of the Terminator switches.)




If two cables are connected, set the Terminator switch to 2.

If one cable is connected, set the Terminator switch to 1.

Display stations and printers with only one socket do not have Terminator switches.

6. After you have checked all of the above, repeat Steps 3.1 through 3.7 in Chapter 3 of the *Setup* manual.

If your display still does not match the layout display, contact your planner and report the problem.

# Customer Setup Error Codes

If a blinking four-digit error code appears in the lower left corner of your display during the setup procedure, refer to the following chart for an explanation and recovery procedure.

| Error Code | Meaning and Recovery Procedure |
|---|---|
| **0080** | The information you just entered in the entry fields has been somehow altered and must be entered again.<br><br>To recover, set the Power switch on the 5294 to Off and repeat 2.12 through 3.31 in the *Setup* manual. |
| **0081** | There are more than the maximum number of work stations attached to your 5294 Control Unit. (An E should appear on your display for every extra display station attached.)<br><br>To recover, disconnect the extra work stations. Contact your planner for assistance. |
| **0082** | The keyboard code you just entered is not valid for your configuration.<br><br>To recover, make sure the information on your display matches the information that is filled in on the *IBM 5294 Setup Form*. If it matches, contact your planner and report an invalid keyboard code. |
| **0083** | You tried to enter a keyboard code for a printer or at a location where no display station exists. (You can enter keyboard codes only beside Ds on the display.)<br><br>To recover, make sure you have the correct address and port number of the display station and enter the keyboard code again. |
| **0084** | Contact your IBM service representative to recover from this error. |
| **0086** | You tried to use the magnetic stripe reader or the selector light pen at your display station but the Expanded Function feature that supports those devices either is not installed in the 5294 or is not working.<br><br>To recover, make sure the Expanded Function feature was ordered and installed in the 5294.<br><br>If you are sure the feature was ordered and installed, contact your IBM service representative.<br><br>If it was not ordered and installed but should have been, contact your IBM sales representative. |

**0087** You entered invalid information in field 5-> on the status line.

To recover, make sure that the positions in field 5-> were entered exactly as they appear on the *IBM 5294 Setup Form*. If they were, contact your planner and report an invalid combination for field 5->.

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# Glossary

**blank character.** A character that does not display but occupies a position on the display screen.

**bps.** Bits per second.

**Cable Thru.** A special feature or standard function that allows multiple display stations and printers to be attached to a single cable path.

**CCITT.** See *International Telegraph and Telephone Consultative Committee.*

**character location.** A location on the display screen at which one character can be displayed.

**circuit type.** A connection between two remote locations. X.25 circuit types can be either PVC or SVC. Both PVC and SVC can be used on the same 5294 Control Unit but not at the same time.

**clicker.** A mechanism that sounds when a key is pressed.

**closed user group.** A closed user group is a group of locations which can communicate among themselves but cannot call to or receive calls from any location outside the group. This facility allows a limited number of users to communicate with either the controller or the host system and thus increases security. It is usually available at a nominal fee or even provided as a basic service with every subscription. On some networks, it is possible to specify different closed user groups for different applications if your subscription includes more than one group and a Closed User Group index is included in the connection setup instructions. Variations which allow calls to or from a DTE outside the group may be available depending on the network.

**cluster function.** A standard function on the 5294 Control Unit that allows the attachment of up to four work stations.

**command.** An instruction that directs the system to perform an operation.

**control unit.** See *controller.*

**controller.** A device used to coordinate and control operations of one or more attached work stations and to synchronize their operation with that of the system.

**cursor.** A movable marker on the screen that can appear as an underscore or as a rectangular block. The cursor indicates where the next character entered from the keyboard will appear.

**data communications equipment (DCE).** This term is used to refer to the equipment installed at the user's premises which provides:

1. all the functions required to establish, maintain, and terminate a connection.
2. the signal conversion and coding between the data terminal equipment (DTE) and the common carrier's line; for example, a modem.

The term DCE is also used to refer to functions performed by a carrier's network node.

**data network identification code.** This is a 4-digit code added as a prefix to the network address when the receiving DTE is attached to another network or is located in another country.

**data terminating equipment (DTE).** This term is used to refer to any machine, such as the 5294 Control Unit or its host computer, that is connected to a network.

**DCE.** See *data communications equipment.*

**DDS.** Digital data service.

**DDSA.** Digital data service adapter.

**direct call request.** Allows an operator to establish communications on an X.21 switched network without entering the network address of the host system. The network subscription must specify direct call request.

**display field.** See *field.*

**display screen.** An electronic vacuum tube, similar to a TV display tube, used to display entered characters.

**display station.** An input/output device containing a display screen and an attached keyboard.

**display station operator.** A person who uses the keyboard to perform operations at a display station.

**display system.** A family of display stations and printers that are attached to a system.

**EBCDIC.** Extended binary-coded decimal interchange code.

**ELLC.** See *enhanced logical link control.*

**enhanced logical link control.** A type of logical link control.

**exclusion key.** A key that, if present on the telephone, is located under the handset and is used to establish communications.

**facility registration.** Allows an operator to change subscription parameters on an X.21 switched network (for example, the closed user group or redirection of calls).

**field.** One or more consecutive positions on the display screen set up for a specific type of data.

**flow control parameter negotiation.** The flow control parameter negotiation facility allows the user to alter packet and window sizes from one call to another. Increasing the packet and window sizes may increase the subscription charge but allows more data transmission in a shorter time.

**formatted display.** A display screen with fields established for specific information. The mode that the display station is in while signed on to the system.

**free key mode.** An operating mode that allows displaying of data without control by a system program (unformatted). The mode that the display station is in before sign-on to the system.

**hexadecimal.** Pertains to a numbering system with a base of 16. Valid digits range from 0 through F, where F represents the highest units position, which is equivalent to decimal 15.

**home position.** The first input position of the first input field.

**host system.** The controlling or highest level system in a data communications configuration.

**image.** The characters or attributes displayed on a display screen.

**incoming calls barred.** This facility prevents all incoming calls to a DTE on all logical channels for a period of time.

**input field.** An area on the display in which an operator enters data. Input fields may be blank on the display and can be preceded by a request, issued by a program, that requires information or an action from the operator.

**International Telegraph and Telephone Consultative Committee (CCITT).** This committee is an organization of common carriers and other interested parties who meet periodically to define standards which they will mutually adopt.

**Link Access Protocol – Balanced (LAPB).** LAPB is the X.25 recommended access protocol used to exchange data between a DTE and the network node to which it is connected. (See *Protocol.*)

**LLC.** See *Logical link control.*

**local loopback.** A test procedure performed to verify the operation of the local modem.

**local network address.** This is the network address of the work station. Some networks require this to be sent with the host network address on a call from the work station to the host system.

**logical channel.** A logical channel identifies a virtual connection between the communications controller and its network node. Permanent virtual circuits are assigned to logical channels at subscription time. Switched virtual circuits are assigned to logical channels each time a connection is set up. The work station can use only one virtual circuit at a time. A one-way logical channel outgoing facility allows the 5294 Control Unit to call the host but will not allow the host to call the 5294 Control Unit. A one-way logical channel incoming facility allows the host to call the 5251 Model 12 but will not allow the 5251 to call the host. (See also *Incoming Calls Barred* and *Outgoing Calls Barred.*)

**logical channel identifier.** This is a 12-bit number used to identify a logical channel. It consists of a 4-bit logical channel group number and an 8-bit logical channel number.

**logical link control.** A series of rules used to exchange units of information over an imaginary circuit between two DTEs which are attached to an X.25 packet-switched network.

**modem.** A device that is used to transmit and to receive data.

**network.** The term network has at least two meanings. A *public network* is a network established and operated by common carriers or telecommunications administrations for the specific purpose of providing circuit-switched, packet switched, and nonswitched-circuit services to the public. A *user application network* is a configuration of data processing products (such as processing units or work stations) established and operated by users for the purpose of data processing or information exchange; such a network may use transport services offered by common carriers or telecommunications administrations.

**network address.** This is the number which the network uses to identify a DTE. The display station operator must key in a host network address in order to initiate a call to a host.

**Network Interface Adapter (NIA).** This is an IBM custom product (5973-L02) that allows SNA machines to communicate through X.25 networks.

**nonsecured data.** Data that is not protected by the system program and usually does not appear on the display screen.

**nonswitched line.** A permanently established communications line connection between the communications controller and the host system.

**null.** The EBCDIC character that represents hex 00.

**offline.** Pertains to equipment or processing that is not being controlled by a control unit or a processing unit.

**online.** Pertains to equipment or processing that is being controlled by a control unit or a processing unit.

**outgoing calls barred.** This facility prevents all outgoing calls from a DTE on all logical channels for a period of time.

**packet.** Information transmitted through a packet switching network is divided up and inserted into packets. These usually consist of control information fields giving destination, sequence number, optional facilities, and often a user data area. Various kinds of packets are used to transmit error codes and supervise the virtual circuit.

**packet size.** The packet size is the maximum number of bytes allowed in the user data area of a data packet. A default value, usually 128 bytes, is assigned at subscription time. On some networks, the packet size can be altered from call to call.

**packet switching.** Packet switching is the transfer of data by means of addressed packets that occupy the network channel only during actual transmission. The channel is available for the simultaneous transfer of packets belonging to other network users. The network determines the optimum routing of each individual packet during, rather than prior to, the transmission from a DTE.

**packet window size.** The window size is the maximum number of packets that the DTE is authorized to transmit and have outstanding at any given time. It is the basic flow control mechanism in X.25 and protects the network from accepting packets faster than they can be accepted by the remote DTE. The window can also be used by a DTE to prevent transmission of packets from the network if the DTE is unable or unwilling to queue them. A default window size, usually 2, is assigned at subscription time. On some networks, this can be altered for a given virtual call.

**permanent virtual circuit (PVC).** A permanent virtual circuit is the packet switching equivalent of a nonswitched line. The work station and its host system appear to the user to be permanently connected.

**physical services header.** A logical link protocol that makes an X.25 virtual circuit appear as an SDLC link to the higher levels of SNA.

**port.** The hardware coupling used to attach the work stations to the communications controller.

**Postal Telephone and Telegraph Administration (PTTs).** A PTT is a national agency providing public communication services.

**power cord.** A cord that plugs into a wall outlet supplying electrical power.

**printer.** A device that provides printed output.

**program.** A computer program written to perform a specific job; for example, order entry or payroll. The program is stored in the host system.

**protocol.** A protocol is a mutually agreed upon formal set of conventions governing the format and control of information exchange between two DTEs. While protocols can increase the complexity of an interface, they greatly increase the efficiency of communication.

The English language is an example of a set of protocols used to increase the efficiency of communication between people.

**PSH.** See *physical services header*.

**Recognized Private Operating Agency (RPOA).** This is a CCITT term for organizations which perform network services.

**Recommendation X.25.** This recommendation for packet-switching interfaces is set by the CCITT (International Telegraph and Telephone Consultative Committee) and amended periodically. The X series of recommendations defines standards for data transmission interfaces.

**redirection of call.** On an X.21 switched network, this optional parameter allows an operator to specify if incoming calls should be directed to another number.

**remote loopback.** A test procedure performed to verify the operation of the local modem, remote modem, and the communications lines between them.

**reverse charging acceptance.** This facility allows the network to pass reversed-charge calls to the DTE.

**reversed charging.** Reversed charging allows virtual calls originating from the work station to be billed to the host being called if the host subscribes to reverse charge acceptance.

**screen.** See *display screen*.

**secured data.** Data that is protected by the system program and usually does not appear on the display system.

**switched line.** A communications line connection between the communications controller and the host system. The line must be established by using the same equipment and transmission lines that are used for voice (telephone) communications.

**switched virtual circuit (SVC).** A switched virtual circuit is the packet switching service equivalent of a switched line. It allows communication between the work station and one of several possible hosts. Switched virtual circuits are also known as virtual calls.

**system.** The main computer and the programming necessary to execute jobs. The system can have numerous display stations and/or printers attached. See also *host system*.

**system cable.** A cable that carries commands and data between the system and the display stations or printers.

**system operator.** A person who uses a display station that is designated as the system console, to activate certain system functions, and control and monitor system operation.

**throughput class negotiation.** The throughput class is the approximate data transmission rate through the virtual circuit under ordinary conditions. (Network congestion could reduce this rate.) Unlike the link access data rate, which is a permanent property of the network connection, the throughput class can be altered by the display station operator if the network subscription allows. The subscription charge may increase with the throughput class selected. Note that choosing a different throughput class may also involve altering packet and window sizes.

**typematic keys.** Keyboard keys that repeat their function when pressed and held down.

**unformatted display.** See *free key mode*.

**virtual call.** See *switched virtual circuit*.

**virtual circuit.** A virtual circuit is a logical connection between two DTEs which enables them to exchange information according to a standard communications procedure with the sequence of information preserved. A virtual circuit occupies transmission capacity only when the data is actually being transmitted.

**work station.** A device used to transmit information to and/or receive information from a system as needed to perform a job; for example, a display station or printer.

**World Trade.** Pertains to the distinction between the U.S.A. and the rest of the world. (Specifically, the term refers to the combination of: IBM World Trade Americas/Far East Corporation, and IBM World Trade Europe/Middle East/Africa Corporation.)

**X.25.** See *Recommendation X.25.*

# Index

## T



## U



## V



## W



## X



## Numerics

**IBM 5294**
**Control Unit**

**Operator's Guide and**
**Operating Procedures**

**Publication No. GA21-9370-4**

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